Planning for flooding:
A network governance perspective on flood risk management

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Thesis submitted for the degree of Doctor of Philosophy

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De rivieren weten meer dan de mens …
The rivers know more than people

(Kouwenaar 1958, cited in De Mul 1995: 56)

Cover picture: The river Tyne, South Tyneside

Source: Author 2013

Abstract

In England, flooding in recent years has had a detrimental effect on the economy, the environment and the health and wellbeing of people. Climate change research suggests that the occurrence and consequences of flooding may worsen in the future. Therefore, effective flood risk management (FRM) is crucial. Traditionally, mainly structural measures, such as barriers and embankments, were taken to prevent flooding. In recent times, the emphasis has shifted to managing the risk of flooding by using non-structural methods as well, such as spatial planning. Simultaneously, there has been a shift from government to governance. Due to privatisation, agentification and decentralisation, decision making increasingly takes place in local governance networks. Actors with differing interests and responsibilities interact and negotiate in order to influence FRM, such as local authorities, the Environment Agency (EA), which has national responsibility for FRM, and developers.

This PhD research explores the nature of network governance in FRM in England. The research focuses on local planning processes to examine the development and functioning of governance networks, in order to identify key factors that influence FRM. To achieve this, a multiple case study approach was applied, comprising two cases of local planning processes. The first case is a major mixed development in the North-East of England that has issues with river and surface water flooding, whilst the second case is a major redevelopment of a cricket ground in the South-East that is at significant risk of river flooding.

The findings show that in both cases governance networks were formed to make decisions on FRM. In the first case, the actors cooperated and were able to implement a sustainable method of FRM. In the second case, the actors were unable to agree and the decision was referred to central government, which granted permission for development against the EA's advice. One key factor influencing FRM was the actors' ability to align interests, in particular the developers, the local authority and the EA, causing either conflict or cooperation in the governance network. The individual interests were derived from various factors, such as legislation, financial benefits and personal preference. The actors then used their agency to reach collaborative or individual objectives by utilising knowledge and structures to their advantage. Therefore, the nature of network governance influences the functioning of these networks, which in turn impacts on the way flood risk is managed.

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Table of contents

List of tables

List of figures

List of abbreviations

AAP	Area Action Plan
ABI	Association of British Insurers
CAA	Civil Aviation Authority
CBC	Chelmsford Borough Council
CFMP	Catchment flood management plan
CSO	Combined sewer overflow
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DoE	Department of the Environment
DSSS	Development site strategy assessment
EA	Environment Agency
FRA	Flood risk assessment
FRM	Flood risk management
IDB	Internal Drainage Board
IPCC	Intergovernmental Panel on Climate Change
LDF	Local Development Framework
LLFA	Lead Local Flood Authorities
LRG	Local Residents' Group
NCC	Newcastle City Council
NDPB	Non-departmental public body

NPM	New Public Management
NPPF	National Planning Policy Framework
NRA	National Rivers Authority
Ofwat	Office of Water Services
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
S106	Section 106
SAB	SuDS approval body
SFRA	Strategic Flood Risk Assessment
SoS	Secretary of State
SRA	Strategic-relational approach
SuDS	Sustainable drainage systems
UDP	Unitary Development Plan
WaSC	Water and sewerage company

Chapter 1 Introduction

1.1 Introduction

This chapter introduces the research topic and rationale for this research, which is composed of the changing approach to flood risk management (FRM) and the way in which it is governed. Section 1.2 briefly introduces the problem of flooding in England, where various floods in the past years have caused much disruption and damage. Section 1.3 explains how the nature of FRM and the way it is governed has been subject to changes over the years, such as the increasing roles of the planning system and governance networks. Section 1.4 introduces theory on governance networks, after which, section 1.5 outlines the research aim and questions, followed by the methodological approach in section 1.6. Then, section 1.7 describes the academic field this research is part of, as well as the contribution it aims to make. Lastly, section 1.8 contains the structure of this thesis.

1.2 The problem of flooding

In recent years, England has suffered from multiple floods. For instance, flooding during June and July 2007 caused much damage and disruption in many parts of England and a heavy rainstorm in the summer of 2012 caused widespread flooding in Newcastle upon Tyne. Not only does flooding have a great economic cost – for instance, the 2007 floods cost an estimated £3.2 billion (Chatterton et al. 2010) – it also has a great social cost. Flood waters are treacherous and people whose houses flood may suffer from physical and psychological problems (Whittle et al. 2010). In addition, much disruption is caused by the loss of potable water, electricity and transport, whilst many people are unable to return to their damaged homes. Therefore, flooding forms a great problem to society.

A flood can be defined as a temporary covering by water of land not normally covered by it (European Commission 2007). There are six types of flooding. Firstly, fluvial flooding is related to flooding from rivers. Secondly, pluvial flooding is also called surface water flooding, caused by rainfall that is not absorbed in the ground or directed away by a drainage system, thereby submerging the ground surface. Thirdly, groundwater flooding occurs when the groundwater level rises above surface levels; this

also includes structures underground such as basements. There is a lack of knowledge about this type of flooding (Macdonald et al. 2012), with data on groundwater floods only starting after the year 2000 (British Geological Survey 2012). Pluvial and groundwater flooding caused many problems across England in 2012, which was the wettest year since 1910, with many locations receiving more than 135% of the annual average of rain (Met Office 2013). Fourthly, coastal flooding refers to land that becomes covered by seawater at times of flood. Fifthly, sewer flooding occurs when the sewerage is engulfed by heavy rainfall or becomes blocked, forcing water and sewage up the drains into roads and buildings. This most often occurs during extreme rainfall events, when surface water sewers and foul sewers are combined into one sewer system, which as a result becomes overwhelmed. Sixthly, when reservoir banks overtop or fail, a reservoir flood takes place. These floods occur very rarely in England.

In 2008, it was estimated that 2.4 million properties in England were at risk of flooding from rivers or the sea and 3.8 million were at risk of surface water flooding. One million properties of these had all three flood risks (Environment Agency 2009c). It is estimated that approximately 1.6 million properties in England and Wales are susceptible to groundwater flooding (British Geological Survey 2012), whilst 1.1 million properties are situated in the vicinity of reservoirs and are therefore at risk of reservoir flooding (Defra and Environment Agency 2011). According to Ofwat, in 2011 approximately 4,700 properties were registered with wastewater companies for being at risk of internal flooding[1] at least once every ten years (Ofwat 2011). However, these figures do not consider combination flood events, such as in Newcastle in 2012, where overwhelmed drains and sewers and ground saturation together contributed to flooding (Newcastle City Council 2013b).

In recent years, the question has been raised whether the problem of flood risk is likely to become worse as a result of climate change. Research suggests that climate change is causing a global temperature rise, rising sea levels and an increase in extreme rainfall events, which are factors that can exacerbate flooding.[2] There is much uncertainty on the way the climate will change and the potential effect on flooding, but recent research suggests that the future increase in flood risk is significant (see Table 1). In particular the heavy rainfall in 2012 raised the question whether this was climate change induced. Although it is complicated to attribute individual weather and flood events to climate

[1] Caused by sewage water flowing into a property through the internal drains.
[2] See section 3.3.3.

change, according to the Adaptation Sub-Committee (2012) it is likely that the extreme weather of 2012 will occur more frequently in the future. If the occurrence of flooding rises in the future, its economic, social and environmental consequences will also be exacerbated. Moreover, new development is still taking place in areas at risk of flooding, which will add to the consequences and costs of flooding (Parker 1995, Adaptation Sub-Committee 2012).

Type of flooding	**Number of properties at significant risk**	**Number of properties 2080, climate change induced**	**Number of properties 2080, including population growth**	**Estimated annual damage**	**Estimated future annual damage (2011 prices)**
River	230,000[3]	Between 320,000 and 580,000	Between 350,000 and 1,100,000	£0.7 billion	Between £0.9 billion and £6.9 billion by 2080
Coastal	100,000[4]	Between 310,000 and 570,000	Between 330,000 and 840,000	£0.3 billion	Between £1 billion and £3.7 billion by 2080
Surface water	50,000[5]	Not estimated	Not estimated	£320 million	Between £510 million and £1 billion over next 50 years

Table 1: Predictions of future significant flood risks in England
Source: Adaptation Sub-Committee 2012, Ramsbottom et al. 2012

Flooding represents a major problem for England at present and is likely to be increasingly so in the future; therefore, effective FRM is crucial. Managing flood risk entails taking the probability and the consequences of flooding into account. The probability of flooding is usually communicated as an annual percentage or a return event; for instance, an area might have an annual 1% chance of flooding, which is the same as being at risk of a flood event once in 100 years. The consequences of flooding

[3] With an annual probability of 1.3% or greater.
[4] With an annual probability of 1.3% or greater.
[5] With an annual probability of 3.3% or greater.

are the effects on, for instance, people, property, the environment and the economy. In addition, FRM does not only consider current flood risks, but also aims to adapt to the effects of climate change. The next section discusses the various ways in which flood risk can be managed.

1.3 The governance of flood risk management

There are many ways in which flood risk can be managed. Traditionally, the approach used was to defend against flooding with structural measures, for instance by modifying existing rivers, building embankments, controlling the flow of water through installing barriers or by creating areas for flood storage (Jha et al. 2012). During the last decades, however, this approach has changed to using integrated methods comprising structural and non-structural measures (Johnson and Priest 2008, Butler and Pidgeon 2011). Examples of non-structural methods are flood awareness campaigns, flood insurance, emergency planning, warning and evacuation systems and spatial planning (Parker 1995, Jha et al. 2012, Meyer et al. 2012). An integrated approach is considered more sustainable, efficient and effective than structural measures alone (Van Herk et al. 2011). In addition, there is a growing realisation of the effects of land use on the risk of flooding,[6] thereby increasing the role of spatial planning in FRM (Wheater and Evans 2009). Through planning, the location, type, design and function of development can be influenced and flood risk can be avoided, reduced and managed (White and Richards 2007). Finally, by taking flood risk and climate change into account in the planning process, proactive action can take place, which is more cost-effective than responding to flood events retrospectively (Wilson 2006a).

The way FRM is governed has evolved as well. There has been a shift from government to governance, which entails that decisions on policy formation and implementation are no longer solely made by the formal institutions of central government. Processes of decentralisation, privatisation and agentification (Kjær 2004) mean that central government has lost power upwards, downwards and sideways (Jessop 1999) and policy decisions are made at a distance from central government in relatively autonomous networks (Rhodes 1997). This has also occurred in FRM, where flood problematisation and decision making is influenced by the action of individuals and collectives (Butler and Pidgeon 2011). However, the power of central government has not disappeared, as

[6] Explained further in Chapter 3.

there are national policies, legislation and funding structures that frame decision making in networks. Therefore, governance in practice often has hybrid characteristics that include hierarchical, network and market arrangements (Klijn and Koppenjan 2012).

In England, the hybrid character of the governance of FRM is identifiable in for instance the fragmentation of responsibilities. Whereas in the past central government and regional water authorities held the responsibility for FRM, now non-departmental public bodies, private water companies, local authorities, developers and residents all have some responsibility in delivering or funding FRM, creating what Hooghe and Marks call a Type II multi-level governance (2003, 2010).[7] To tackle flood risk, multiple authorities with differing responsibilities interact in network arrangements. These responsibilities are often set in legislation, which can impact on the flexibility of this type of governance to respond to new flood problems. This became apparent in the floods in 2007, when pluvial flooding affected large parts of the England but no authority could be held accountable or take responsibility (Pitt 2008). One solution to this type of flooding would be to make use of sustainable drainage systems (SuDS), such as ponds that store rainwater, but no authorities are willing or able to be held accountable for maintenance and adoption (Wheater and Evans 2009). Even though the governance system is evolving and new opportunities for managing flood risk are being developed, structures created in the past can stand in the way of generating effective solutions. Therefore, decisions made in networks are framed by structures that are part of hierarchical or market arrangements.

Another influence in the changing governance of FRM is the increasing role of planning. Local planning processes provide the arenas in which actors involved in managing flood risk and planning frequently meet. These actors with varying responsibilities and interests interact and make decisions in a network setting. A key question is how responsibilities and powers are divided and how this impacts on the way FRM is delivered in practice, particularly in the case where flood risk conflicts with other aims such as development (Butler and Pidgeon 2011). This question is partly addressed by Pardoe et al. (2011) who examined the delivery of FRM in planning and in particular the conflict between 'land and water, water and people' (Pardoe et al. 2011: 2898). They conclude that in the UK this conflict is articulated in particular on a case-by-case basis. Actors involved in decision making, such as planners, the Environment Agency (EA) and developers are mutually dependent, creating a 'sensible process of

[7] See section 2.2.2.

negotiation, where both sides are balanced in terms of power', which allows 'compromises to be made that balance the inherent conflicts of water and people on land' (Pardoe et al. 2011: 2900). However, another study by Tunstall et al. (2009) shows that these different actors may have diverging perceptions and definitions of flood risk, which complicates this process of negotiation more than Pardoe et al. suggest.

The actors do not form the only element that influences FRM, because the wider context in which decision making takes place also plays a role. Richards (2005) researched institutional influences on flood risk policy and development control decisions, and identified three key factors that most likely contribute to how local authorities set requirements to mitigate flooding and approve development in flood risk areas. These include: flood experience in a local authority, stakeholder practice and development pressure. If a local authority has flooding experience, it is more inclined to request structural measures as part of its policy instead of non-structural measures. The effect on development control decisions was less apparent, as in some cases development was still allowed in flood risk areas. In particular, Richards (2005) found cases where local planning authorities approved developments based on the EA's advice, even if it was not compliant with their own local policies. Therefore, the influence from actors and how they interact is apparent. Furthermore, local authorities tended to permit development more in urban areas than in rural ones, which can be an indication that development pressure influences building in flood risk areas. Lastly, Richards noted interactions between the three factors, where flood experience increases the number of stakeholders involved, but development pressure lowers the importance attached to flood risk by stakeholders. This implies that there is a relationship between the decision makers and the wider context. At the same time, exceptions were found, which is in line with research by Pardoe et al. (2011) that shows that every local planning process is different and multiple processes can have diverse outcomes.

Building upon the results of research in FRM and in order to explore how decisions are made on FRM and which key factors have contributed to these decisions, the influence of the governance system and the wider context should be considered. The governance system is composed of multiple actors with varying responsibilities and interests, who interact within a network set at a distance from central government. By examining decision-making networks in detail, the impacts of the actors and their interactions can be identified. In addition, the impact of the wider context, such as structures, and the

interaction between the network and the wider context, can explain the FRM outcomes as they are observed in practice. In order to understand these relationships in the context of FRM, this research draws on network governance theory, which is briefly outlined below and elaborated on in Chapter 2.

1.4 Network governance theory

Decisions on FRM are made in the local planning process within governance networks. Therefore, what occurs in these networks influences the delivery of FRM. There are various theories, ideas and concepts of governance networks, but the main features commonly ascribed to a governance network are as follows:

- It is a relatively stable horizontal articulation of interdependent but operationally autonomous actors;
- Actors are from the public, semi-public or private sectors, or civil society;
- Actors interact through negotiations;
- The network operates within an institutionalised framework of rules, norms, shared knowledge and social imaginaries;
- The network is self-regulating within limits set by external agencies, such as central government;
- The network contributes to the production of public purpose (Sørensen and Torfing 2007, 2009).

These features show that actors are influenced by structures, such as rules and norms, but also have some discretion in making decisions. Therefore, both actors and structures influence the outcome. Structures can be divided into informal and formal structures. Informal structures are social structures such as norms and values, whilst formal structures are rules and policies, which can impose limits on decision making in a network. For instance, central government can exert influence on the network by creating structures of legislation, policies, strategic lines, procedures and financial resources (Jessop 1995b, Cowell and Murdoch 1999, Whitehead 2003, Swyngedouw 2005, Grix and Phillpots 2011).

Sørensen and Torfing (2007) argue that governance networks are important parts of contemporary governance processes. In their contribution to the network governance debate, they distinguish two generations of governance networks research. The first generation, such as research by Rhodes (1996) identified the existence of networks as a

type of governance. The second generation has acknowledged the existence of these governance networks, but places emphasis on the workings of governance networks and their consequences for policy making. The second-generation research mainly attempts to address the following gaps in knowledge:

- How can the formation, functioning and development of governance networks be explained?
- What are the sources for failure and success of governance networks?
- How can self-regulating networks be regulated?
- What are the democratic problems and potentials within governance networks (Sørensen and Torfing 2007: 14)?

Even though the second-generation research of network governance mainly focuses on the same gaps in knowledge, there is no universal application to conduct this research. Sørensen and Torfing, whose work has made major contributions to the debate, advocate the need for examining concrete, empirical cases of governance networks by combining various theoretical perspectives (Sørensen and Torfing 2007), such as governance theory, network theory and institutional theory (Osborne 2010). In addition, analysis of governance networks often focuses on common themes, such as actors, interdependencies, interactions and institutions (Klijn and Koppenjan 2012). This can help to identify the influence of actors and structures on an outcome, not only through the network arrangement, but also by including hierarchical and market influences (Klijn and Koppenjan 2012). Relating the outcome to actors and structures may contribute to an explanation of why even though governance networks have the ability to create effective and efficient solutions, a network can fail, resulting in decisions that are poor, biased or not based on consensus (Torfing 2012).

The research aims to contribute to network governance theory by applying the network governance perspective to FRM. It aligns the key questions in network governance theory with those that concern FRM. First-generation network governance research has already engaged with FRM; for example, Butler and Pidgeon (2011) identified the presence of governance networks in FRM. This research aims to contribute to second-generation research, by examining two cases of governance networks and identifying what influences decision making on FRM. The next section translates these intentions into a research aim and questions.

1.5 Research aim and questions

The overarching aim of this research is to explore the nature of network governance in FRM in local planning processes in England and its influence on the outcome of FRM. More specifically, the research aims to address the following questions:

1. How has network governance of FRM developed?
2. How do governance networks in FRM function?
    a. How do governance networks in FRM form?
    b. What actors are present?
    c. What are the characteristics of these actors (e.g. roles, responsibilities, interests, resources, perceptions and preferences)?
    d. How do actors interact?
    e. How do the wider context and the governance network interact?
3. What are the key factors in network governance that influence FRM?

1.6 Methodological approach

This research applies a stratified ontology,[8] based on critical realism (Bhaskar 1975, Sayer 2000). In this perspective, the world is composed of structures and mechanisms, events and non-events and people's perceptions. Structures are natural and social phenomena that exist independently of how people perceive them, but people will try to understand the real world and manipulate structures and mechanisms to produce desired events. Social structures are related more closely to agency, as these structures would not exist without agents, but at the same time, when a social structure is created it exists whether or not people are aware of it (Mingers 2004). People can affirm or reject social structures, but different people might perceive structures differently, or might have different awareness of the barriers and opportunities they present, which impacts on their behaviour. Therefore, both agents and structures matter. As a result, the outcome of a decision-making process is not only influenced by natural and social phenomena and events, but also by the way agents have experienced them and acted upon them to create a desired effect.

This research adopts a network governance approach, which involves studying concrete, empirical cases (Sørensen and Torfing 2007). In addition, the nature of this research

[8] As opposed to a purely foundational ontology, leading towards a positivist epistemology; or an anti-foundational ontology, leading towards interpretive approaches.

requires detailed examination of a decision-making process and the influence of structure and agency. Therefore, the choice has been made to adopt a case study approach. The chosen cases are two local planning processes in which decisions are made on how to manage flood risk in new, major, mixed-use developments. The first case focuses on Newcastle Great Park, a large housing and commercial development on former green belt land in the North-East of England. This development is at risk of flooding from the rivers Ouseburn and Letch and from surface water flooding. The second case examines the redevelopment of a cricket ground in Chelmsford in the South-East of England. The development includes cricket-related facilities and housing, but is at significant risk of flooding from the river Can. The data has been collected through semi-structured interviews, document analysis and site visits. The analysis of the cases entails a detailed investigation of the governance network, the wider context and the key factors that have influenced FRM.

1.7 Academic field and contribution

This research is grounded in the social sciences and more specifically in spatial planning. It aims to contribute to the development of theories on network governance, whilst also gaining knowledge on how FRM is managed in practice as part of the planning process and how key factors influence this.

Research conducted on FRM and planning is composed of a variety of orientations. Firstly, policy-oriented research has been carried out on for instance national policy development by analysing the shift from flood protection to FRM and the role of planning (Penning-Rowsell and Handmer 1988, Tunstall et al. 2004, Butler and Pidgeon 2011). Other policy-oriented research has been conducted towards the implementation of national FRM policies at the local level (Richards 2005, White and Richards 2007, Tunstall et al. 2009, Pardoe et al. 2011). A study by Tunstall et al. (2009) focused on the adoption of national policy in practice by examining a planning application and public inquiry relating to a development in a flood zone. It discussed the interpretation of policy wording, disagreement over flood risk calculations and models and arguments in favour of development as part of wider sustainability benefits. It showed an example of how the planning authority, applicants and the EA failed to reach an agreed outcome, after which the application was decided by central government. However, the focus was not on the actors, the decision-making process and contributing factors that led to a failure to reach an agreed outcome. It did not examine the process, but the content of the

decision. It also mainly focused on the policy framework and not on other structures or the influence of agency.

Secondly, FRM research has been conducted in the field of problem-oriented policy research, which is concerned with the causes of problems, potential solutions and the effect a policy intervention has on the problem and the wider environment (Scharpf 1997). There is a vast amount of research on technical aspects of flood risk and flood protection, originating from geography or engineering disciplines. These examine methods for establishing the risk of flooding, the prediction of flooding and methods for protecting against flooding. In addition, the social science literature has focused on the role of planning in reducing the problem of flood risk (Penning-Rowsell and Handmer 1988, Parker 1995, Howe and White 2004).

Thirdly, interaction-oriented policy research focuses on the actors involved in decision making and the process they go through. This was the focus of much of the research conducted by Scharpf (1997), but not in the context of FRM. Hence, there is a gap in knowledge on governance networks in FRM and the key factors that influence FRM, which this research aims to address by focusing on the influences of actors and structures on decision making in planning processes.

This research also aims to contribute to network governance theory, in particular by contributing to knowledge about the development and functioning of governance networks. It builds on existing research by for instance Sørensen and Torfing (2007), who apply a multi-disciplinary approach. Network governance theory does not prescribe any universal rules for analysis, therefore a study that aims to apply network governance would benefit from developing a guiding theoretical framework (Lewis 2011). In this research, a theoretical framework is developed in Chapter 2 by drawing on some aspects of governance theory, network theory and institutionalism. By analysing two governance networks, using this theoretical framework, a contribution is made to governance network theory and to knowledge on governance networks in practice.

1.8 Structure of the thesis

After this introduction, Chapter 2 presents a literature review, focusing on the notion of governance and networks. Using established theories, a theoretical framework is proposed that informs data collection and analysis. The framework sets out how a

governance network functions by being set within a wider context in which institutions, structures, events and other agents may influence a network. The governance network itself forms a structure as well, within which various agents interact and make decisions. The agents perceive the structures, experience barriers or opportunities from them and affirm or defy them, thereby affecting interaction, behaviour and policy outcomes.

Chapter 3 analyses how the governance systems for FRM and for planning have evolved from being two separate systems towards a combined arrangement. It focuses on how the nature and governance of FRM and planning have developed. This development also includes the emergence of governance networks and therefore this chapter proceeds to describe the main actors and structures involved in FRM.

Chapter 4 describes the ontological and epistemological perspective on which this research is founded and explains the applied research design and methods in more detail. It also lays out the method for case selection, data collection and analysis and discusses ethical considerations. It concludes with a section on reflexivity.

Chapters 5 and 6 focus on two cases of governance networks that were formed as part of a local planning process, in which decisions were made on how to manage flood risk in a new development. Each case chapter tells the story of the planning process. It looks at the wider flood risk and planning context in which the network is situated, the actors involved, their interactions and the ultimate outcome.

Chapter 7 analyses the outcomes of the case studies and relates this to the used theoretical framework. It thereby contributes to the further development of network governance theory and adds to knowledge on the governance of FRM in local planning processes.

Chapter 8 provides a conclusion to the research. It summarises the results, answers the research questions and discusses limitations of this research and recommendations for further research.

Chapter 2 From government to network governance

2.1 Introduction

This chapter begins by exploring general governance theory in section 2.2. The main focus is on descriptive debates within governance, which examine the organisations and rules involved in policy formation and implementation. Scholars participating in these debates have identified a shift taking place from government to governance. This shift entails that government is making less use of hierarchical arrangements of governing and instead promotes collaborative decision making. As a result, policy formation and implementation increasingly takes place within networks of public and private actors. Therefore, section 2.3 further explains the concept of networks and discusses several network approaches and theories, including network governance theory. Based on the literature covered in this chapter, a theoretical framework is developed in section 2.4, which is used to collect and analyse data and to answer the research questions.

2.2 Governance theory

The debate on governance has been prominent within the social sciences for some decades. There is a concurrence that governance refers to a process of governing that is not defined by hierarchy, but rather based on the interaction of multiple public and private actors (Stoker 1998a). However, in literature the term 'governance' is used in a variety of ways with different definitions and meanings (Stoker 1998a, Davoudi and Evans 2005). For instance, some debates are normative, focusing on how the government should manage its collective affairs. These debates are based on ideologies, such as those derived from Marxism and regulation theory. In regulation theory, the state has a key role in guiding economic development by using various forms of governance (Jessop 2008), such as rules, laws, regulations and policies. Due to the interdependent relationship between economic, social and political features of society[9] these rules and policies are present in many sectors (Stoker 1998b), including urban politics (Judge et al. 1995). The shift from government to governance is explained by moving away from Fordism towards post-Fordism (Davoudi and Evans 2005). Fordism aims for mass production by separating the production process into small and

[9] For instance in a Fordist regime, social welfare can maintain a healthy labour force and sustain consumption (Stoker 1998).

specialised tasks. In post-Fordism, flexibility and automation in the production process is achieved by using technology and allowing for specialisation by smaller firms (Judge et al. 1995). The process of globalisation is not only evident in the economy, but also in politics. The state system is denationalising and is losing power upwards, downwards and sideways, coupled with a movement away from top-down governing towards more decentred governance mechanisms (Jessop 1999).

Other debates on governance are descriptive, examining the agencies, interests and regulatory systems that are involved in making and implementing policy (Davoudi and Evans 2005). This research focuses on this descriptive debate, in which the argument made is that a shift from government to governance has taken place. The term 'government' represents a hierarchy, in which central government has control over policy formation and implementation. Governance is a new type of coordination that has taken the place of government, characterised by public and private agents who are involved in policy making through coalitions, partnerships and networks with an increased autonomy from central government. The number of public, semi-public and private agents that are involved in policy is increasing, as European, regional and local authorities and external agencies become involved in the decision-making process.

Kjaer (2004) explains this shift through the emergence of New Public Management (NPM), in which the public sector incorporates private sector management techniques, such as decentralisation, privatisation and agentification. Decentralisation can occur through deconcentration, which is the decentralisation of policy implementation to local levels, whilst central government still formulates the policies. Decentralisation can go further, when devolution occurs, which stands for a decentralisation of all authority. The process of agentification comprises the establishment of various semi-public agencies, which are non-departmental public bodies (NDPBs). Whilst the government still designs policy, the implementation of certain policies is managed by agencies (Kjær 2004).

According to Rhodes, a transformation of the public sector has taken place, which 'involves "less government" (or less rowing) but "more governance" (or more steering)' (Rhodes 1996: 655). State functions are lost through privatisation, agentification, EU policy making and NPM, but the discretion of public servants remains limited and as a result, the state becomes hollowed out (Rhodes 1997). Therefore, governance takes place in 'self-organizing, interorganizational networks' (Rhodes 1996: 660), where

interdependent organisations undertake game-like interactions and have certain autonomy from the state.

In academic and political circles, the term 'governance' is most often used to signify a new mode of governing that is distinct from hierarchy and instead signifies a cooperative mode where public and private actors participate in networks (Mayntz 2003). These networks are relatively self-regulating, meaning that there is a degree of freedom to decide on public policy without being directly controlled by a state (Van Kersbergen and Van Waarden 2004, Torfing 2005). However, that does not mean that networks are autonomous from central government or that indeed central government has lost power to govern. Jessop argues that within modes of governance, the state exercises power to organise networks in order to achieve their goals. For instance, central government might develop a strategic line, which is then translated into regional and local action through institutional arrangements (Jessop 1995b, Cowell and Murdoch 1999).

Whitehead (2003) and Swyngedouw (2005) also claim the government has not disappeared from governance, but the two co-exist. In an attempt to retain an influence in policy outcomes, the government adapts to new forms of governance and fills in the hollowing out of strategic capacity, thereby creating a hybrid form of governing (Bache and Flinders 2004). Central government's power has therefore not disappeared, but has been adapted to new forms of governance in order to retain control over public policy. For instance, any networks that are formed as part of a mode of governance, often operate in the shadow of the hierarchy (Scharpf 1994). Decisions made in networks are often subject to approval of a higher-level authority, whilst this authority might also have created the network itself and the procedures the network has to follow.

Some scholars have used specific cases to counteract the conceptualisation that there has been a shift from government to governance. Skelcher (2000) has observed that within partnerships in urban regeneration, training and health, central government heavily influences networks. It for instance stimulates the creation of these partnerships or networks, it creates inducement through financial resources, gives preferential treatment in access to other resources, or sets up rules, such as programme approval and monitoring procedures. By creating partnerships and controlling resources, central government strategically forces networks in a strict framework, to ensure central government's objectives will be met. Laffin (2009) examined the social housing sector

as an example where the influence of central government is still high, although the means through which central government exerts power have changed.

Grix and Phillpots (2011) argue that some governance arrangement may at first seem to be based on multi-agency decision making, but if these arrangements are examined in more detail, an underlying hierarchical power structure becomes visible. Central government has much influence in these networks, for instance by controlling resources. The other actors involved as part of governance, have in reality little power to influence decision making. This results in what Grix and Phillpots call 'asymmetrical network governance', which is effectively a strategy to enhance control over policy. They illustrate this claim by examining the sports policy sector, where most of the NDPBs are controlled by central government through linking financial resources to set criteria and only if targets are met is funding released. Grix and Phillpots' study demonstrates the importance of gaining a deep understanding of governance networks, by not assuming that just because a network is created, actors have an equal say. Instead, underlying power structures must be taken into account to explain interactions and outcomes.

Apart from hierarchy forming an important influence within a network, the presence of private actors also introduces a market element into networks. The neo-liberal climate and NPM have caused privatisation and deregulation to promote competition in providing public goods and services and as a result, the government has lost power to the market. However, even though neo-liberalism stands for 'less state, more market', market failures such as imperfect competition, unaccounted market externalities and inequality still require the state to command and steer (Sørensen and Torfing 2007). Market forces in networks will therefore be balanced through hierarchy and cooperation in networks, which means that 'the invisible hand will be combined with a visible handshake' (Jessop and Sum 2006: 268). As a consequence, governance structures and practices are often of a hybrid constitution, in which hierarchical, network and market arrangement are combined (Klijn and Koppenjan 2012).

On the presence of hierarchy and market influences in network arrangements, Jessop concludes that 'markets and hierarchies still exist, of course; but both operate in a context of negotiated decision-making' (1999: 13), balancing market and hierarchical forces through actor interaction. Jessop therefore concludes that 'it is for these reasons that the negotiated economy can be described as a "third way, between market economics and central planning"' (Jessop 1999: 13). In other words, governance is a

new way of governing that is different from hierarchy and market coordination, but at the same time this does not mean these forces are absent in governance processes, due to privatisation and the state trying to keep some control in decision making.

In addition, even though trends in governance can be identified, there is no one specific type of governance. Central government applies many different styles of governance with many different purposes and arrangements can vary between policy fields or even between individual issues. There is no governance in general, but rather specific instances of governance in action, and every case is unique (Cowell and Murdoch 1999). Governance therefore does not constitute a whole; instead there are different arrangements which are governed through a form of self-organisation (Jessop 1995a).

2.2.1 Meta-governance and network management

Meta-governance is a term developed by Jessop (e.g. in his 1999 work) to describe government influence within governance arrangements in order to keep control over policy. Meta-governance relates to the 'practices and procedures that secure governmental influence, command and control within governance regimes' (Whitehead 2003: 4), by organising self-organisation, also labelled the governance of governance (Jessop 2009), or in Foucault's terms, the conduct of conduct (see section 2.2.3). The government applies meta-governance to define the procedures of any governance arrangements as well as the specific outcomes that are to be achieved (Cowell and Murdoch 1999).

Jessop (1999) argues that meta-governance is not just applied by the government, but by any actor who wants to influence the decision-making process. According to Jessop, in a decision-making network the government is just an equal actor amongst all other actors. Even though it has its own distinctive resources that other actors do not have, such as public money and law, other resources, such as private money, knowledge and expertise, also carry weight in negotiation. This creates interdependence between government actors and other actors. The government holds unique resources others rely on, but simultaneously, other actors hold resources that are equally important to the government; for instance political support, cooperation with implementation and private investment (Compston 2009). Furthermore, resources that are vital, such as knowledge, are dispersed between public, semi-public and private actors. Therefore, in a governance

arrangement the government has to adapt the way it can influence decision making by using a wider range of resources:

> The exchange of information and moral suasion become key sources of legitimation and the state's influence depends as much on its role as a prime source and mediator of collective intelligence as on its command over economic resources or legitimate coercion.
>
> (Jessop and Sum 2006: 268)

On the other hand, it can also be argued that the government is not an equal actor, but has more powers than any other actor. Grix and Phillpots (2011) made this observation as part of their research into governance and created the term 'asymmetrical network governance'. They argue that the government holds special powers; for instance central government can use hierarchical direction to influence networks, in order to set the agenda and predetermined goals (Peters and Pierre 2004), in addition to determining the rules a network has to abide by. Moreover, the public actor has characteristics that are different to other actors in the network. Instead of there being one public actor, there might be multiple individuals present that represent different governmental authorities or departments with varying interests. Moreover, there might also be semi-public actors present, for instance NDPBs that are semi-autonomous from the state, but have some public interests. Therefore, government is a divided actor and cannot be treated as a unitary actor.

Meta-governance can be applied exogenously, for instance by rule setting, or it can be used to influence the network internally, for instance by direct participation or process management (Klijn and Koppenjan 2012). Dutch scholars such as Klijn, Koppenjan and Termeer (1995) have specialised in these forms of meta-governance using the term network management. Network management is a form of steering in networks that is aimed at promoting joint problem solving or policy formation (Kickert et al. 1997). It is aimed at 'initiating and facilitating interaction processes between actors, creating and changing network arrangements for better coordination' (Kickert et al. 1997: 10). As a result, actors with divergent goals and preferences will work towards harmonising their strategies. According to Klijn, Steijn and Edelenbos (2010b) network management can contribute to improved outcomes, especially when the network is dealing with a difficult problem.

Klijn, Koppenjan and Termeer (1995) make the distinction between network structuring and game management or process management. Network structuring alters the network

itself, for instance by introducing or excluding actors, changing the existing distribution of resources, the rules of the network and existing perceptions. Through game or process management, the network structure remains untouched. For instance, the group of actors remains the same, but there may be a selective activation of some actors in a policy game to reach an agreement. The resources are not changed, but instead there could be a strategic mobilisation of resources. To aid the decision-making process, some networks appoint a network manager who manages the process. This can be a public actor, an actor delegated by a public authority or by the network as a whole, or a single actor who takes the lead (Sullivan and Skelcher 2002). Network managers can improve the decisions that are made, help to overcome any conflicts and will keep track of the time it takes actors to reach an outcome.

The type of network management applied by a public actor can depend on the preferences of that actor. If a governmental actor has strong views on the type of outcome it wants to achieve, it might use network structuring by hierarchical direction to control the actors. However, if the government perceives process rather than the outcome as being the ideal, it may want to try and manage the process if it becomes stagnant or entrenched. Therefore, there is a difference between governance being interpreted as a means or as an end, which will determine the role the government plays in a network.

2.2.2 Multi-level governance

A separate but overlapping part of the governance debate is the notion of multi-level governance. In the early 1990s, multi-level governance emerged in academic literature to analyse the European integration process (Enderlein et al. 2010). In 1993, Marks observed a new system of negotiation between nested governments at various territorial tiers, with some of central government's decision-making power moving up to the supranational level and some moving down to the regional and local level. He used the term 'multi-level governance' to describe the notion of several tiers of governments interacting and making decisions (Marks 1993). The term has since been applied on many occasions, especially to the subjects of European integration, comparative federalism and international relations. Multi-level governance is often applied to public authority arrangements, but it can also be widened to include non-political actors (Enderlein et al. 2010).

Hooghe and Marks (2003, 2010) argue that multi-level governance is the most efficient governance arrangement to adapt to policy issues that can vary enormously in scale, from global issues such as climate change to local-level issues, such as city services. How multi-level governance is organised can be categorised into two types. The first type of multi-level governance, simply called Type I, is characterised by the dispersion of authority to a limited number of levels, which are of general purpose. There are international, national, regional, meso-level and local authorities with multiple functions, whose boundaries do not intersect. This type of governance is usually stable. In Type II governance, authority is divided between task-specific jurisdictions, resulting in a large number of authorities, with no set boundaries (Hooghe and Marks 2003, 2010). Tasks are divided between a variety of organisations, which means that if a new issue arises, there might be a possibility that no organisation is willing or able to take responsibility for it. However, Type II governance should in theory be flexible, with new organisations being developed or existing ones absorbing new tasks if needed. The result of Type II governance is that there will be a wide variety of actors involved in decision making, which could complicate the process. It also increases complexity for citizens when they want to raise an issue, as they will not deal with a single authority, but rather with a range of agencies. In that case, it may be difficult to find the agency that is responsible for an issue, or none may be willing to take up the issue.

The core of multi-level governance is the presence of multiple actors, who may be all-purpose public authorities on different territorial levels, or task-specific actors from public bodies, agencies or the private sector who are involved in forming and implementing policy. Therefore, multi-level governance is linked to network governance literature. Kohler-Koch and Eising even prefer to speak of 'network governance' in the European Community rather than multi-level governance (Van Kersbergen and Van Waarden 2004). They see governance in the EU as a network in which state and societal actors interact together in highly organised social sub-systems. Central government is in that case: 'vertically and horizontally segmented and its role has changed from authoritative allocation "from above" to the role of an "activator"' (Kohler-Koch and Eising 1999: 5). The notion of governance, multi-level governance and network governance are therefore closely related and overlap can often be found in the literature.

2.2.3 Governmentality

The change in the manner of governing, from hierarchy to governance, may also be seen as a new governmentality. The term 'governmentality' was used by Michel Foucault as a guideline to analyse the government and how it governs society from Ancient Greek times through to modern neo-liberalism (Lemke 2001). It therefore refers to how we think about governing (Davoudi and Madanipour 2013). Governmentality is expressed through a discourse, or a collection of ideas centred on a certain belief, which rationalises the use of direct and indirect power by the government. Indirect control over organisations and individuals is used to steer conduct that affirms the discourse (Burchell 1996). The government attempts to shape our behaviour through 'the conduct of conduct'. This government is composed of a plurality of governing agencies and authorities, which aim to influence a wide variety of behaviour according to particular but various norms and for various outcomes (Dean 1999). To do this, the government uses a combination of specific techniques and procedures (regimes of practices) and the use of local or regional sites of power articulated into mechanisms for producing knowledge, whether for accumulating knowledge on individuals or on subjects (Jessop 2008). Knowledge therefore plays an important role to exert power and to shape an individual's identity.

The mechanisms that are used to govern and achieve outcomes are referred to as technologies (Davoudi and Madanipour 2013). Two technologies are important to Foucault: firstly, the technologies of power, which 'determine the conduct of individuals and submit them to certain ends or domination, an objectivizing of the subject' (Foucault et al. 1988: 18); and secondly, technologies of the self, which 'permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being' (Foucault et al. 1988: 18). The technologies of power are methods and knowledge used to dominate over others, for instance by the government. The technologies of self, which can be individuals in government or those being governed, show that individuals are able to think and behave on their own account and can resist existing constraints or structures. Dean (1999) calls this the technologies of agency, which is aimed at enabling an individual to use their freedom and capabilities to achieve certain outcomes, for instance through empowerment, consultation and negotiation. The contact point between the way people are being driven by others and the way people conduct themselves is what forms the government (Lemke 2001).

The current trend of governance is the result of a neo-liberal governmentality (Lemke 2001). Neo-liberal forms of government utilise direct intervention through state apparatuses, but also through indirect techniques for leading and controlling individuals without being responsible for them. Individuals are deemed self-responsible for social risks, such as illness and unemployment, and are supposed to be moral, responsible and economic-rational. By creating apparatuses and also by making individuals and groups self-responsible, governance takes place within networks with a plurality of actors, who govern other groups and individuals (Sørensen and Torfing 2007). As individuals adopt the neo-liberal governmentality, these self-regulating networks are expected to produce results in line with the predominant discourse. The technologies of self mobilise individuals' agency and capabilities, whilst the technologies of power are used to ensure that behaviour and outcomes achieve government's ends (Davoudi and Madanipour 2013).

Foucault addresses the same subjects as governance theory, examining the way in which the government controls society. He states that the government is not a centralised authority; rather, its powers are diffused. By creating a governmentality that individuals believe in and adopt, the government can still have influence over the decisions that are being made outside central government. The government does this using a mixture of measures; it applies top-down methods, such as rule making, but also uses the ability of individuals to make decisions for them, for instance within networks. The use of top-down methods controls agency and ensures that decisions made are in line with government ends. In the words of Cowell and Murdoch (1999) and Jessop (Jessop 1995b), the state creates a strategic line that is extended into regional and local decision-making processes through institutional arrangements. Therefore, Foucault's work links to literature on governance and networks, as he states that in a neo-liberal climate governing occurs at a distance, away from the state, through actors working together in networks.

2.3 Network theory

The previous section discussed contemporary governance and various strands of governance theory. Governance involves multiple actors interacting to make decisions on policy, and networks therefore play an important role. This section examines several network theories. In policy science, network theory is seen as one of several approaches to researching policy, amongst other theories such as institutional approaches and

rational choice approaches (John 1998). It also provides an alternative to pluralist and corporatist models. Whilst pluralism states that power is dispersed amongst a large number of groups and the government plays a passive role in policy formation, in corporatism, a limited number of organisations hold power and are recognised or created by central government. These two models do not exist in reality in pure form, which is why the concept of networks was created.

A unitary network theory does not exist; instead there is a wide variety of perspectives of what a network constitutes and how this can be applied to research. Börzel has organised this '"Babylonian" variety of policy network concepts and applications' (Börzel 1998: 253) and claims that the common characteristic of networks between disciplines is that it encompasses a variety of interdependent actors with relatively stable patterns of interaction, who exchange resources and who share common interests with regard to a policy (Börzel 1998). However, these common interests usually refer to an interest in an outcome being reached, whilst actors could still have conflicting interests. Therefore, actors might not pursue the same goals, but they are willing to negotiate, because not reaching an agreement would be less beneficial to them than making concessions.

Börzel (1998) and Marsh and Smith (2000) distinguish between different types of network research. Firstly, some theories are quantitative and others qualitative; these two forms are not mutually exclusive, but complimentary. The quantitative approach analyses networks in terms of their relationships, looking at factors such as cohesion and centrality. The qualitative approach focuses on the process and the content of interactions between actors as opposed to the structure. Secondly, a distinction can be made between theories that treat networks as a typology of interest intermediation, which are part of a decision-making process in policy formation and implementation, and theories that regard networks as a specific form of governance. The former uses the term 'network' as any kind of relation between public and private actors, where the network is formed to mobilise resources. The latter type falls under the category of 'network governance' and views networks as a specific form of governance that is an alternative to hierarchy and market (Börzel 1998, Marsh and Smith 2000). However, this distinction is fluid and not always clear. Research that considers networks as a typology of interest intermediation can also be extended to become part of network governance theory, by considering wider issues of policy formation and implementation.

2.3.1 Regime theory

The first theory that examined governance networks is regime theory, which formed the foundation of network theory. It was Stone who developed regime theory whilst studying informal networks between the local authority and local businesses in Atlanta, US. He called this relationship a regime and defined it as: '*the informal*[10] *arrangements by which public bodies and private interests function together in order to be able to make and carry out governing decisions*' (Stone 1989: 6; emphasis in original). The characteristics of a regime are as follows:

- Regimes include public and private economic parties;
- Regimes have common policy agendas, usually the economic development of a city;
- Regimes are relatively stable;
- Regimes are relatively autonomous;
- Actors are interdependent and have access to institutional resources;
- Regimes do not need to share the same beliefs and values, but achieve a consensus on policy (Stone 1989, Mossberger and Stoker 2001, Davies 2003, Stone 2005).

Regime theory is based on political economy (Stone 2005). It acknowledges that economic forces play an important role in decision making, but emphasises that political forces shape decisions as well (Imbroscio 1998). Where the theory describes the privileged position of business in governmental decision making, it uses elements of neo-Marxism (Judge et al. 1995). However, it moves away from it as well by rejecting the structuralist assumption that economic forces determine policy (Mossberger and Stoker 2001, Davies 2002), by acknowledging that 'politics matters' (Judge et al. 1995: 56) and by being less state centred (Mossberger and Stoker 2001). Furthermore, power plays an important role in regime theory; not as a way to exert social control (power over), but rather as a tool for creating social production (power to) (Imbroscio 1998).

Stone links regime theory to governance by stating that 'governance through informal arrangements is about how some forms of coordination of effort prevail over others … it is not about absolute control' (Stone 1989: 5–6). Another characteristic that regimes and governance share is that complexity is central, as it acknowledges that actors are

[10] The arrangement is regarded as informal, because it is formed voluntarily (Stone 1989).

involved in a complex network of interdependence. The state cannot have complete control, but must combine its capacities with non-governmental actors (Judge et al. 1995). Some scholars specifically place regime theory under the umbrella of governance, such as DiGaetano and Klemanski (1999) and Mossberger and Stoker (2001). Regimes can therefore be seen as a type of governance, with a specific set of actors (local government and businesses) and a specific policy agenda (urban economic development) (Pierre 2005). Others, such as Bassett (1996) and Mossberger and Stoker (2001) specifically mention the regime as a type of network. A regime would then be a network with strong relations between the local government and businesses, which still can be interpreted as a type of governance.

The application of regime theory in the UK proved to be more limited than in the US, because, whilst in the US local government depends more on business to implement policy, in British policy processes the market is less influential and the state plays a larger role (Bassett 1996, Mossberger and Stoker 2001). Local authorities in the US are more dependent on business for tax revenue and experience greater economic competition amongst themselves (Judge et al. 1995). In the UK, local government is more influential and the business sector less influential, which means that regime theory would lose in strength and descriptive and explanatory power if applied to UK cases. Regime theory was more of a starting point in examining the influence of multiple actors in a policy process. The second step was the development of network theory, which does not limit itself to the influence of businesses on policy decisions, but includes a variety of public, semi-public and private actors. However, many of the characteristics of regimes are still applied to networks, as will become clear in the next few paragraphs.

2.3.2 Rhodes' network theory

Rhodes developed a prominent version of network theory by describing governance as 'self-organizing, interorganizational networks' (1996: 660). These organisations have mutual dependencies based on resources, causing a need to exchange resources and to negotiate, resulting in game-like interactions (Compston 2009). According to Rhodes, these networks are not accountable to the government and therefore have a significant degree of autonomy. However, Rhodes concedes that the state does have some influence to 'indirectly and imperfectly steer networks' (Rhodes 1996: 660), even though this influence is limited.

As Rhodes argues that governance is equal to networks, the analysis of governance should take place on a micro level and should focus on individuals within networks.[11] That is why Rhodes, together with Bevir and Richards, developed the decentred approach (Bevir and Rhodes 2001, Bevir and Richards 2009). This approach focuses on the diverse beliefs and practices of political agents (Goodwin and Grix 2011). These individuals make a choice about what beliefs to hold and what actions to perform. Individuals can choose to adopt a certain belief or tradition, but they can also choose to reject or modify it. This is also valid for beliefs about institutions and the government. The way in which individuals adopt or modify government traditions will shape the type of governance, which explains differences in governance between countries.

Network analysis based on the decentred approach focuses on the individuals present in a network and the ability to create and act on beliefs and meanings (Bevir and Richards 2009). The approach is therefore based on an anti-foundational ontology and an interpretive epistemology (Goodwin and Grix 2011), because the focus is on the meanings individuals within a network attribute to the world around them and the action they take as a result. It therefore rejects the influence of structures on decision making.

2.3.3 Networks and institutions

Whereas the decentred approach looks at the influence of agents in networks, other theories focus on the influence of structures and institutions. These theories are founded on institutionalism, which perceives institutions as being the main determinant of policy outcomes. Networks can also be an institute or structure in themselves (Bevir and Richards 2009).

As with governance and networks, there are many different definitions of what institutions are. March and Olsen define an institution as:

> A relatively stable collection of rules and practices, embedded in structures of *meaning* that explain and justify behaviour – roles, identities and belongings, common purposes, and causal and normative beliefs.
> (Marsh and Olsen 2006: 691; emphasis in original)

These rules and practices can both be formal and informal. Formal institutions are official rules, laws and policies, whilst informal institutions are unwritten rules that

[11] This is contrary to some research that focuses on governance at the macro level, in order to produce a single narrative of the development of governance.

guide human interaction, such as conventions, codes of behaviour and the norms and values that are present in society. These informal ways that structure human interaction are more complex to define, describe and analyse than formal rules (North 1998).

Institutional change is an incremental process through a continuous creation and evolution of institutions over time. Within a formal institutional framework, formal rules can change on a short-term basis as the result of political decisions, but informal institutions such as traditions and codes of conduct generally only evolve slowly over time (North 1998). Institutions influence the roles, identities, powers and resources of actors and organise the interactions between actors. Institutions in a policy process therefore guide decision making. Due to institutional change, the constraints and opportunities for behaviour and thus the possible strategies for agents continually change as well.

There are various strands of institutional theories with different ontological and epistemological foundations in existence, such as historical, sociological and rational choice institutionalism. Sociological institutionalism focuses on the informal norms and rules actors choose to abide by, to avoid social disapproval or exclusion (Helderman 2007). Within historical institutionalism, institutions are perceived as a system of formal and informal rules that regulate political action. Institutions in this approach are enforced through the state. Political struggles take place within an institutional framework, but the outcome of these struggles will also impact on this framework through incremental change (Sørensen and Torfing 2007). Political structures provide constraints to agents, but agents also play a part in maintaining and changing these structures. Rational choice institutionalism presupposes that individuals make rational decisions based on expected costs and benefits. Individuals develop strategies and play games to ensure the best outcome. Therefore, if the institutions are identified, agents' behaviour and the outcome can be predicted.

In addition, Scharpf (1997) developed an actor-centred institutionalism with elements of rational choice theory and applied it to decision making in policy processes. He argues that policy is the result of interactions of bounded rational actors, who will act on the basis of their perceived reality and their subjectively defined interests. The purpose of their action is to achieve maximisation of self-interest and they will play strategic games with each other in order to reach their goals. The institutional setting – for instance, a

network – influences the actors' behaviour, and by defining this institutional setting and the actors, the policy games and outcome can be predicted.

Some actors are individual actors and only represent themselves in the process, whilst others are composite actors who are representatives of the organisation they work for. Scharpf (1997) also characterises actors by their orientations, which comprise perceptions and preferences, and the capability to deploy resources. An actor's perception is formed by their cognitive orientation, which is the observation of facts such as cause and effect relationships. An actor's knowledge is derived from their institutional framework, which is shared by other actors. The more orientations differ, the more difficult interaction between actors will become.

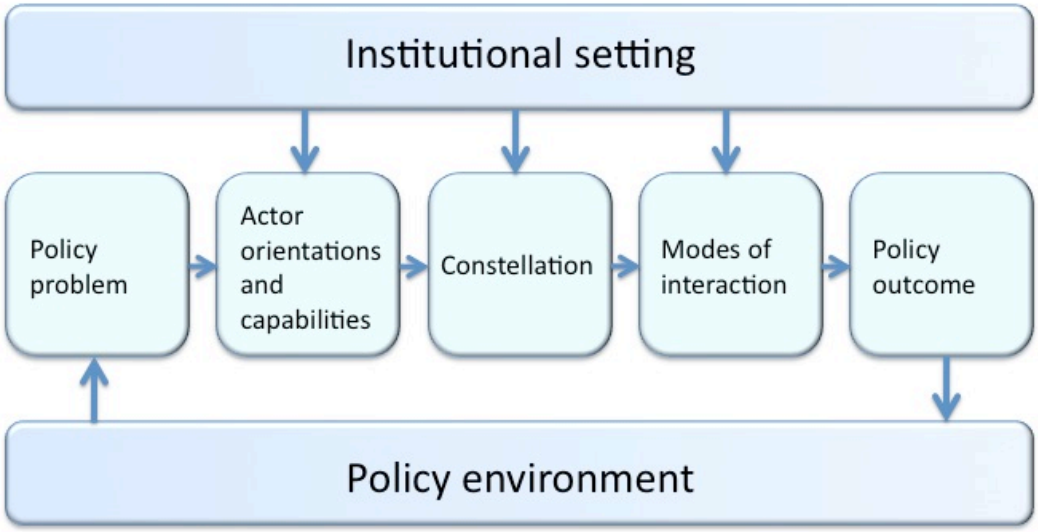

Figure 1: Actor-centred institutionalism
Source: Adapted from Scharpf 1997: 44

Preference is categorised into interests, norms, identities and interaction orientations. There are five different interaction orientations, namely: individualism, solidarity, competition, altruism and hostility. The second characteristic of an actor in addition to the orientations is the ability to deploy resources. Resources, such as knowledge, labour and financial resources are needed to ensure that other actors within a policy process are dependent on the actor. Lastly, the constellation and mode of interaction influence the policy outcome. A constellation can be founded on coordination, mixed motives and conflicts, which influences the interaction between actors. The institutional setting also affects the interaction, for instance actors within a network interact through negotiations and/or unilateral action. This differs from a market setting with predominantly unilateral

action and from a hierarchy that involves majority voting and hierarchical direction (Scharpf 1994).

Actor-centred institutionalism is a deductive, positivist and quantitative approach to analysing policy processes, which is based on very different ontological and epistemological beliefs compared to Rhodes' anti-foundational decentred approach (Rhodes 2006). Scharpf's model does not take the influence of agency into account as Rhodes' approach does. It sees individuals as being ruled by institutions and their desire for self-maximisation. It assumes policy outcomes can be predicted if the institutional setting is known. However, even if human behaviour could be simplified in this manner, predicting any policy outcomes will still be complex, as it will be difficult to identify all relevant institutions.

Even though institutionalism is often applied as part of network governance, it is not applied in the way Scharpf meant. Some scholars adopt a 'non-formal, context-oriented and "thin" rational choice perspective' (Hertting 2007: 45), presuming that actors in governance networks are more or less rational and understand and give meaning to their actions in specific contexts. The approach is 'thin' because actors are presumed to have perceived rationalities, rather than objective rationalities based on maximising their self-interest. This perception is derived from the specific context they are acting in, such as social and cultural, political and administrative contexts.

2.3.4 The dialectical model of networks

The theories discussed so far focus either on the influence of agents or structures on decision making, but there are other approaches that examine the way agents and structures influence each other and therefore both influence policy making. For instance, structuration theory by Giddens (1984) is a well-known theory in the social sciences, in which agency and structure support each other and cannot exist without each other. Structures are maintained and created by agents, and they are dynamic, as their existence depends on the use of structures by agents. Individuals are purposive and reflexive agents, who have reasons for their specific action and can explain these reasons. Agents use resources, or structured properties of social systems, which provide agents with power as they can use them to control other agents. Power is not a resource on its own, but resources are media through which power is exercised. Not all resources are equally distributed and some resources are limited, such as authoritative resources

(control over people) and allocative resources (control over material resources). Additionally, the agent has to be able to use these structures. This can cause autonomy or dependency relations between actors, causing a continuity of power. However, Giddens states that even agents who are dependent on others still have some resources that they can utilise to influence the behaviour of their superiors (Giddens 1984, Parker 2000).

Structuration theory can be useful in explaining behaviour in policy networks. A network is formed within a social structure that provides opportunity and constraints to the actors within the network, including the presence of resources. If agents are able to use the resources available, they can exercise power over others. The structure and resources are independent from the agent and network, but it is the agent's responsibility to use or reject and try to change them. Therefore, the structure influences the agent, but an agent can also influence a structure.

Another theory using the dialectical structure/agency approach, but in relation to the state specifically, is the strategic–relational approach (SRA) by Jessop, which places the state and political systems in a broader environment of social relations. The state is not just a product of social development, but also an important influence on the structure and dynamic of social formations. SRA defines the core of the state apparatus as a:

> distinct ensemble of institutions and organizations whose socially accepted function is to define and enforce collectively binding decisions on a given population in the name of their 'common interest' or 'general will'.
>
> (Jessop 2008: 9)

SRA involves a dialectical relationship between structure and agency, which are interlinked by the use of strategy. Social structure is the result of structurally inscribed strategic selectivity by agents. Constraints or opportunities that structures provide to agents are dependent on time, space, agency and strategy. Agents are reflexive to their particular situation and undertake strategically calculated and structurally oriented action. Agents are able to modify some structures, providing them with conjectural opportunities, but they might also come across structural constraints that cannot be altered. Structures only exist within the temporal and spatial horizons of action pursued by actors, whilst actors always act within specific action contexts formed by institutions and the interaction of other social actors. A structural constraint for one agent may pose as a conjectural opportunity for another, but structures might also be different over time

or space. Furthermore, agents may adapt their strategies to their experiences. The study of specific agents that undertake specific action for the realisation of a specific goal, in a specific time and space, will result in an explanation of the exercise of power (Smith 2000, Jessop 2008).

SRA explains that agents are influenced by structure, but they have to use their agency to affirm or reject these structures. As it presumes structures are independent of agents, SRA is premised on a critical realist philosophy of social science (Jessop 2008). Structural conditions, including power, are 'real' and exist independently of our knowledge. However, it takes human agency for these structures to become an influence on behaviour and action (Fawcett 2011).

Marsh and Smith (2000) also apply a critical realist approach, but with the aim to explain decision making in policy networks. In their dialectical approach, they identify three dialectical relationships: between the structure of the network and the agents, between the network and the context within which it operates and between the network and the policy outcome (Figure 2). Each of these relationships is dialectical, because it forms 'an interactive relationship between two variables in which each affects the other in a continuing iterative process' (Marsh and Smith 2000: 5).

In a network, structures influence agents and the network, but agents interpret these structures and negotiate constraints and opportunities that are derived from these structures. Structures can be internal and external to the network. Internally, when interaction becomes institutionalised, the network itself forms a structure. Externally, the broader political and social–structural context forms a framework within which the network operates. Changing structures or other exogenous developments can therefore cause change in a network, but agents will interpret these changes and negotiate the effect it will have on the network. As a result, even though elements such as institutions, network structure or resources exist independently from agents, these agents will have to interpret and apply them and therefore these elements are all to an extent socially constructed. Although the model shows a relationship between the network and the outcome, this relationship is complicated and not causal; the model is neither predictive nor deterministic. The dialectical model does show the complexities involved in network decision making and the relationships between elements involved. One of the relationships between elements is feedback between the policy outcome, the structural context and the learning process of actors. The eventual policy outcome feeds back into

society by changing the broader context. Moreover, outcomes in a network can also affect agents that participate in other networks, for instance by learning or by acquiring new resources.

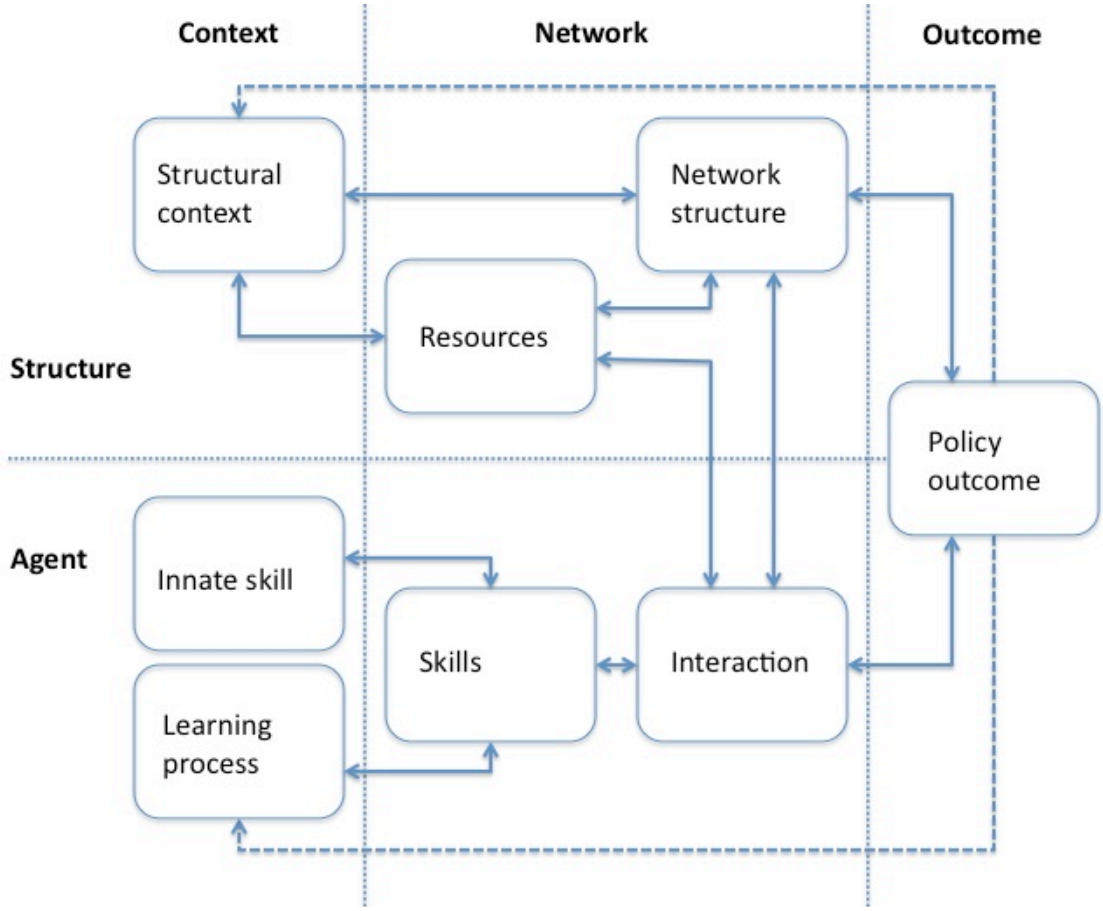

Figure 2: Dialectical approach to networks
Source: Adapted from Marsh and Smith 2000: 10

Marsh and Smith (2000) explain that agents in a network have preferences or interests that are partly defined from the membership in that network, but they also have other, perhaps contradictory interests derived from the broader structure or from being a member in another network. They also claim that network members have innate skills, which affects their capacity to use opportunities or negotiate constraints, but what this entails is not clarified (Raab 2001). Furthermore, actors' preferences are lacking in the model, even though for instance Scharpf (1997) argues that this affects the policy outcome.

Another shortcoming of the model is addressed in a later article by Toke and Marsh (2003), who apply the dialectical model to analyse policy change for genetically

modified crops in the UK. They find that by applying the model to a case, some weaknesses are revealed. Firstly, there is no distinction between groups of actors and individual actors. Secondly, the influence of inside groups may be exaggerated at the cost of outside groups. In the case of genetically modified crops, environmental groups had much agenda-setting power and they also pressurised supermarkets into no longer selling these foods, which was not an outcome decided by the network. It can be argued, however, that outside influence is present through the dialectical relationship between context and network. The model would benefit from adding that, in the context, not only structural influences are relevant, but also influences from agents. This strengthens the dialectical relationship between structure and agency. After all, if a network is composed of structure and agency, it is only logical that the context would also comprise both structures and agents.

In response to Marsh and Smith's dialectical approach, Evans (2001) discusses how this approach uses macro-, meso- and micro-levels of analysis to examine policy networks and policy outcomes. He visualises the complex relationship between the network as a structure and the wider context comprising structure and agency. Evans' model therefore excludes the micro-level analysis of relations inside the network.

Figure 3 shows the network existing within a wider policy environment, in which formal and informal institutions, ideologies, history, culture and beliefs, macro-economic variables, other networks and external agents and groups all influence the network. Simultaneously, the network itself affects the policy environment. Evans identifies the exogenous key factors that influence a network and its outcome by connecting macro structures to the meso structure of the network. The network itself is represented as a black box and does not show the impact the different elements of the environment have inside the network. It also fails to show the decision-making process between agents in a network and therefore lacks clarity on a micro level.

A more comprehensive approach to analysing networks would include the dialectical relationship between the environment, the network, the actors and the policy outcome. Marsh and Smith's approach (2000) forms a good starting point. It enables an analysis on three abstract levels: the macro environment, the structure of the network and the micro-level relationships between actors and their decision making. The governance network itself forms the network structure, which influences decision making. The

micro-level analysis inside the network shows the interaction between agents and the policy outcome.

The dialectical model's weakness is the lack of detail regarding what the structural context is composed of, but this has been addressed by Evans (2001). However, both the dialectical model and Evans' model leave out some detail in the micro level. This is where actor-centred institutionalism can provide the missing elements, by identifying the institutions that are present in the structural context, but also by looking at actors' preferences in more detail. The deductive nature of institutional theory would not be adopted, but instead the critical realist stance would remain in place, which allows for the influence of agency.

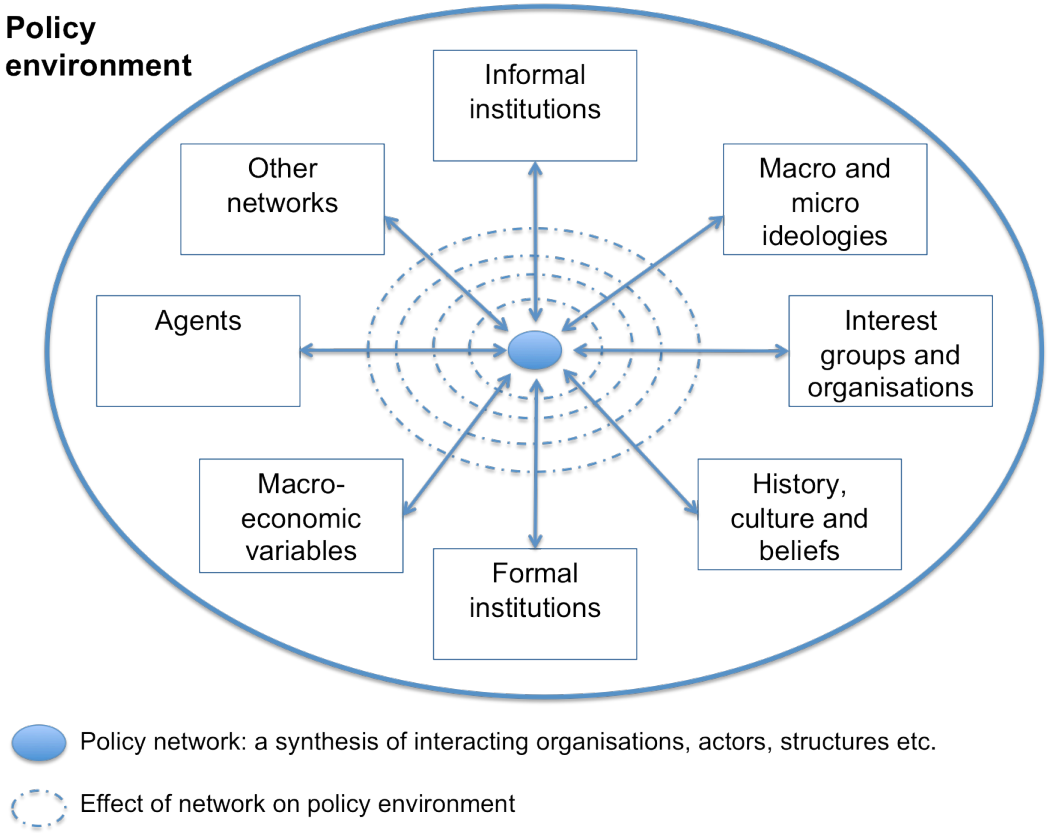

Figure 3: Dialectical approach visualised by Evans

Source: Adapted from Evans 2001: 544

Marsh and Smith (2000) state that their dialectical model examines the roles networks play in policy development and implementation, as opposed to networks being treated as a new form of governance. However, that does not mean the model cannot be extended to form part of the governance debate. Governance can be treated as a structure that is part of the context of a network, being present in formal and informal

institutions, political structures and in external agents. This means that a political culture favouring network governance will influence the establishment of governance networks and could influence the agents in the network if they agree with this governmentality and strive for cooperation and autonomous decisions making without relying on central government. The predominant type of governance will influence the type of networks that are established and their outcomes. Type I multi-level governance will create small, tight networks in which responsibility is clear, which might stimulate cooperation. If Type II multi-level governance is prevalent, large networks are created that include many agencies with overlapping boundaries. As responsibility and authority may be muddled, decision making becomes complicated. On the other hand, there might be an increased flexibility, which increases the ability of agents to adapt to new circumstances. Furthermore, any policy outcomes will affect the network governance debate. If networks are successful, it will reinforce the idea that network governance is the desired arrangement, but if networks fail it may cause doubts, or a change in the way policy is decided upon.

2.3.5 Network governance theory

An additional strand of governance research[12] examines governance arrangements that involve networks (Van Kersbergen and Van Waarden 2004). In recent years, meta-analytical literature on network governance has emerged (Lewis 2011), initiated by scholars from the Centre for Democratic Network Governance at Roskilde University (e.g. Sørensen and Torfing) and Dutch scholars with a background in network theory (e.g. Klijn and Koppenjan). The Centre for Democratic Network Governance focuses specifically on network governance research, whilst scholars at other universities have also contributed, resulting in a series of books on network governance with a collection of chapters by various authors (Marcussen and Torfing 2006, Bogason and Zølner 2007, Sørensen and Torfing 2007).

Sørensen and Torfing (2007) argue that some of the past research on networks, institutions and governance can be classed as a first generation, because it focused on the emergence of governance networks, including work by Kooiman, Rhodes, Jessop and even Foucault. Even though these authors did not use the term 'network

[12] Van Kersbergen and Van Waarden argue that there are nine approaches to governance: network governance, good governance, international relations, self-organisation, economic governance, corporate governance, NPM, multi-level governance and private network governance (2004).

governance', Sørensen and Torfing argue that their research can be perceived as such, because they examined the formation of networks as part of a governance arrangement and the differences between networks and state and market-led coordination. Building on these past studies, Sørensen and Torfing seek to develop a second generation of research, which focuses mainly on four topics: research on the formation, function and development of governance networks, research on the failure and success of networks, research on meta-governance and research on democratic problems and potential in these networks. This second generation of network governance research aims to be multi-disciplinary, meaning that:

> Political studies of institutions, power and decision making are articulated with sociological studies of culture, communication and social control and organizational studies of cognitive frames, learning and resource exchange. Different theoretical approaches are drawn upon in the attempt to address research problems derived from studies of concrete, empirical cases of network governance.
>
> (Sørensen and Torfing 2007: 6)

Governance networks are seen as a specific form of governance (through networks) or a specific form of network (as part of governance).[13] The networks are composed of a plurality of actors, such as politicians, administrators, interest groups, private companies and citizens, who interact and negotiate to achieve public outcomes (Torfing 2005). The definition of a governance network includes institutional influences, such as hierarchical rule, and agency influences, such as the culture and values of actors. It therefore attempts to combine network theory, institutionalism and governance theory by defining a governance network as:

> A relatively stable horizontal articulation of interdependent, but operationally autonomous actors, who interact through negotiations, which take place within a regulative, normative, cognitive and imaginary framework, that is self-regulating within limits set by external agencies, and which contributes to the production of public purpose.
>
> (Sørensen and Torfing 2007: 9)

The regulative, normative, cognitive and imaginary framework is further explained as comprising:

> A regulative aspect, since it provides rules, roles and procedures; a normative aspect, as it conveys norms, values and standards; a cognitive element, given that it generates codes, concepts and specialised

[13] The terms 'network governance' and 'governance networks' are often used interchangeably. Network governance can be seen as the type of governance that is realised through networks, whilst governance networks can be seen as those networks that are established as part of a governance arrangement.

> knowledge, and an imaginary aspect, seeing as it produces identities, ideologies and common hopes.
>
> (Torfing 2005: 308)

The definition focuses on networks being relatively autonomous, but it also recognises that even though it is a network governance arrangement, outside authorities are likely to have an influence: for instance government imposing rules onto a network. In addition, it combines thoughts about the bounded reality actors live in and their agency, by referring to cognitive and imaginary frameworks. Lastly, it acknowledges the influence of institutions and structures by including the regulative framework and normative framework. This use of four different frameworks can also be found in actor-centred institutionalism through formal and informal institutions and actors' preferences and perceptions. Therefore, this network governance theory borrows heavily from established theories, which is its strength. It promotes the application of a variety of established theories, founded on the dialectical approach, in which both structure and agency influence the production of public purpose.

Even though network governance theory is producing more knowledge on governance networks and addresses issues regarding their function and their failures, it does not provide a unitary method to research governance networks. Therefore, when applying the network governance lens to a research, there is no restriction to certain theories or research methods. Moreover, if a scholar uses the term, it does not always imply that a combination of thoughts on networks and institutions has been applied; network governance is a relatively flexible concept.

Lewis (2011) also argues that even though network governance theory has made a contribution to research in this field, for instance by defining the governance network, there is still a need to establish a theoretical framework to guide analysis. However, Lewis sees this openness as a strength, offering a diversity of approaches and providing researchers with a choice in what method they find best to apply. Simultaneously, Lewis states that synthesising different approaches will be the most rewarding approach to increase knowledge on governance networks, by regarding these networks both as structures and cultures.

Klijn and Koppenjan (2012) find that even though network governance theory does not provide a universal approach, common concepts and assumptions can still be identified. Firstly, network governance research examines actors, their perceptions and their interdependencies. Secondly, as a consequence of perceptions and interdependencies,

complex interactions and patterns of negotiation emerge between actors, which will influence the outcome. Thirdly, the interaction patterns become institutionalised, forming a certain network structure of social interaction and patterns of rules. Lastly, when network processes become complex, guidance and management of interactions are required. This concept of network management is another element that is examined as part of network governance research.

However, even though network governance provides guiding elements in what influences decision making, it does not explain how these elements are interlinked. For instance, how does the constellation of actors determine what normative, cognitive and imaginary framework is being tapped into to make decisions? Can the frameworks explain what public purpose is being produced? Moreover, network governance theory does not explain change. How can frameworks that actors are using change? What does that mean for the policy outcome? Where does this change come from? Network governance theory still leaves many questions unanswered and network governance research should therefore also be aimed at identifying relationships between the elements of governance networks.

Other scholars have observed more substantive issues with network governance theory. For instance, Davies (2011, 2012) argues that network governance is part of a hegemonic strategy based on a neo-liberal perspective. He acknowledges the existence of networks as a type of interest intermediation and an arena for exchanging resources, but states that network governance as an ideal type of governance, built on collaboration, trust and empowerment, does not exist. Instead, he states that network governance is based on hierarchy, closure and coercion. Davies – inspired by Marxism – claims that this hierarchy and coercion is vital for the maintenance of social order. He therefore argues that the shift from government to governance has never taken place and that it is misleading to characterise institutions as ‘hierarchies’ or ‘networks’.

However, previously discussed research is more balanced. For instance, scholars such as Jessop (1995b), Whitehead (2003) and Swyngedouw (2005) argue that even though elements of hierarchy have not entirely been eliminated, the shift from government to governance has taken place. Network governance is characterised by decision making at a distance from central government, where actors operate within a certain institutional framework, but with a degree of discretion. Governance networks and the actors within

the network have the ability to influence the outcome and are therefore not completely coerced.

Moreover, even though Davies argues that governance networks 'have no special potential' (2011: 152), other scholars such as Klijn et al. (2010a) and Agranoff and McGuire (2001) have discussed the opportunities that networks provide to collaborate, build consensus and create synergy, which will be further discussed in section 2.4.2. For instance, actors can share knowledge, resources and ideas and implement a decision together, but they would not do this without a degree of trust. This ideal type of network may not always be achieved, but it is certainly a possibility. Even though Davies' perspective on network governance does not entirely reflect policy practice, it does emphasise the importance of understanding and identifying the hierarchical elements within a network and the effects on the actors and the outcome.

2.3.6 Summary

The theories covered in this section examine the way the government governs. The term 'governance' is used to indicate a shift has occurred away from hierarchy, towards an arrangement that includes a variety of agencies and actors, dispersed over multiple spatial levels, from the public and private sector, such as discussed in the multi-level governance approach (e.g. in the work of Hooghe and Marks 2003, 2010). Even though multiple actors are involved in decision making, central government is still able to exert control, for instance by using a combination of technologies of power and technologies of self (Foucault et al. 1988).

Networks play an important role in governance and various approaches and theories have been developed to study these networks. Some theories focus on studying the beliefs and behaviour of individuals in networks. For instance, Rhodes developed an approach that studies individuals, their beliefs and behaviour to explain policy outcomes (Bevir and Rhodes 2001, Bevir and Richards 2009). Other theories such as actor-centred institutionalism use the influence of structures to explain policy outcomes (Scharpf 1997). Finally, dialectical approaches take both agents and structures into account when analysing the influences on policy outcomes (e.g. in the work of Marsh and Smith 2000).

Building on past theories on governance, networks and institutions, a network governance theory has emerged that specifically examines networks that are part of

governance arrangements. This emerging theory provides a definition of governance networks that includes the influence of agency and structures. Within a governance network, interdependent actors interact within a normative, cognitive and regulatory framework to produce public purpose. However, there is no explanation of how the agents, structures and outcome influence each other, even though there are existing approaches and theories on governance, networks and institutions that could provide this explanation. This research therefore includes a theoretical framework that combines several of these approaches and theories. The theoretical framework is founded on critical realism and focuses on the dialectical relationship between structure and agency, which is explained in the next section.

2.4 The functioning of governance networks

The purpose of developing a framework for analysing governance networks is to examine how governance networks are functioning and to guide data collection and analysis. The framework is based on multiple theoretical perspectives centred on concepts of governance, networks and institutions. It applies a dialectical relationship between the network and the environment, between the network and the agents, and between the network and the outcome, as applied by Marsh and Smith (2000). To provide more detail, elements from Evans' approach (2001) and Scharpf's institutionalism (1997) are included as well.

Network functioning is dependent on influences from structure and agency, which affect the interaction within a network and the outcome. The theoretical framework, visualised in Figure 4, shows the functioning of a governance network once it is formed, by placing the governance network in a wider context. The network is not a closed structure, but is open to the wider structural context. This wider context influences the network, but the network influences the wider context as well. The governance network itself is composed of a policy problem, the actors, their interactions and the outcome. All elements are open to wider influences, visualised by the dashed lines, whilst the arrows represent the relationships between the different elements.

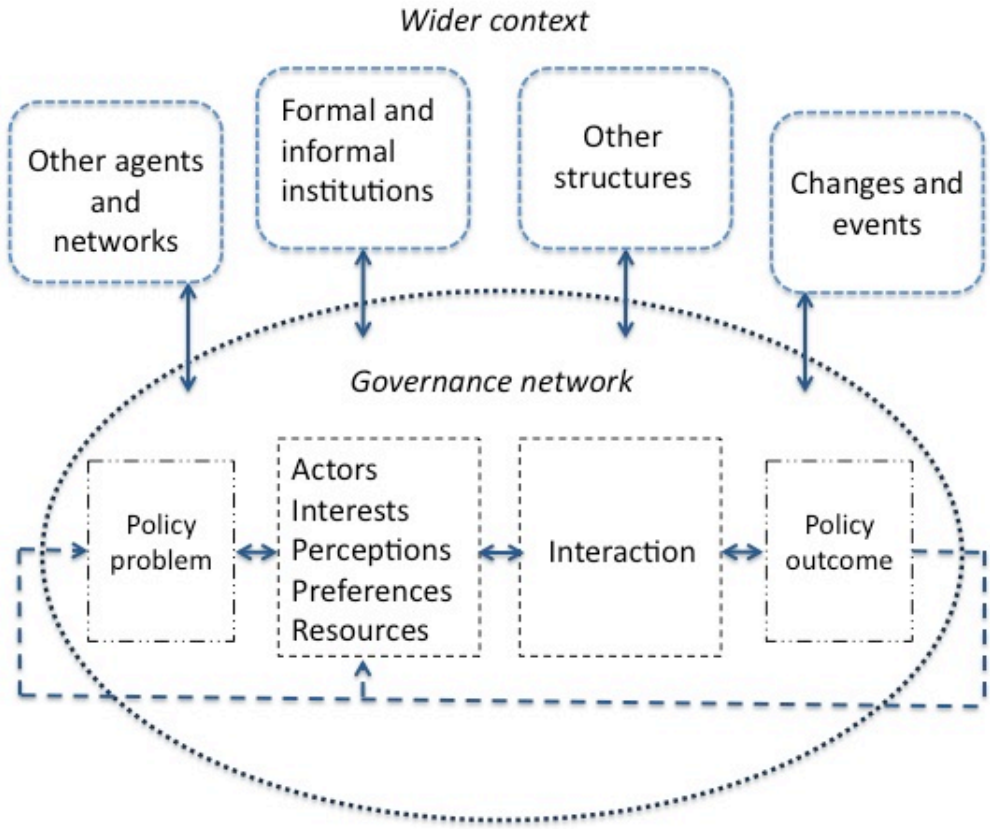

Figure 4: Functioning of governance networks

The elements are dynamic and a change in one element will impinge on other elements and ultimately the outcome. Each change in an element is negotiated by the agents in the network and can alter the actors present in the network, their resources, perceptions, preferences and interactions. This section describes each element and their relationship with other elements.

2.4.1 Formation of the governance network

Networks can be formed for a variety of reasons. Firstly, the network might be formed as a response to the emergence of a policy problem that actors wish to address. A network can also be formed voluntarily; for instance, by a group of actors who share a common goal or vision or by the actions of a strong actor who mobilises others (Waddock 1989). Networks can also be the result of direct or indirect governmental direction. For instance, public authorities can create networks directly by creating a mandate or rules and policies to form statutory networks, in which agencies have to make decisions together. Networks are formed indirectly through creating conditions for

the establishment of a network (Hoff 2003), for instance by offering financial incentives to those agencies that join a network, as is the case with for instance public–private partnerships.

The way the network has formed can influence the structure of a network and its outcome. Firstly, the hierarchical mode of coordination can be of great influence in networks that have been indirectly created by government, as Grix and Phillpots (2011) and Laffin (2009) found in their research. The level of self-regulation and freedom can differ significantly between governance networks, which will affect the outcome. However, even when a network is formed under the influence of a public authority, there is usually still a degree of self-regulation within the limits set by external agencies.

Secondly, the interaction may differ between voluntary and involuntary networks. If a network is formed voluntarily, the actors in that network will have agreed in advance that cooperation is fruitful. The voluntary network may be ideological in nature, focusing on the process of cooperation and thereby improving interaction. This improves the chance of synergy and an outcome all actors agree with. On the other hand, if a network is formed involuntarily, a positive interaction is not guaranteed. An involuntary network may be functional in nature, having been assigned externally. Its focus is on achieving a decision or outcome, whilst the process of negotiation and cooperation, instead of it being the starting point of interaction, is one that has been forced upon the network.

Finally, the inclusion and exclusion of actors in the formation stage may affect interaction and the outcome. Edelenbos and Klijn (2005) argue that early involvement of actors stimulates joint decision making, increases support for the outcome and prevents the use of veto power. Even though including more actors may complicate decision making, overall it can save time when impasses are prevented. Therefore, excluding actors in the early stages when the network is formed may create problems later in the process, especially when the excluded actors have the power to block decision making.

2.4.2 Policy problem

The policy problem in a governance network can be a general policy problem (for instance, flood risk on a site), but the exact definition, boundaries and meaning are part of an actor's perception (for instance, the exact flood levels or the consequences of

flooding). As actors define the policy problem, it is dynamic and might be redefined during the decision-making process. Therefore, the problem definition can differ between actors and can be contested (Brownill and Carpenter 2009). The policy problem can also be of a wicked nature and might have risks attached (Torfing 2005). Wicked problems are often surrounded by cognitive uncertainty (Van Bueren et al. 2003). Firstly, there is uncertainty about the nature of the problem; the problem is complex and there is a lack of knowledge. In addition, there can be discrepancies between the problem definitions of various actors. Secondly, there will not be a true or false solution to a wicked problem. Thirdly, a wicked problem has no clear end to it; it is unknown when or if it will ever be solved (Rittel and Webber 1973). Furthermore, institutional uncertainty is created when various decisions on a problem are taken in different policy fields or governmental levels (Van Bueren et al. 2003). Additionally, actors will originate from different institutional backgrounds, which can cause conflicts. Lastly, actors working with a wicked problem make strategic choices, causing strategic uncertainty that can influence the problem-solving process (Koppenjan and Klijn 2004).

If a policy problem is wicked or associated with much uncertainty, actors can respond in various ways to deal with uncertainty. For instance, actors can start collecting information, conduct research or involve other actors to attempt to reduce uncertainty surrounding a problem (Koppenjan and Klijn 2004). However, this approach is not always successful. For instance, research on the effects of climate change is still surrounded in uncertainty, which complicates decision making.

Some scholars argue that networks can be effective in dealing with these wicked problems, because they have the ability to combine knowledge and generate better solutions, as well as increasing the chances of implementation (Parker 2007, Brownill and Carpenter 2009, Klijn et al. 2010a). Networks could even create a synergy, where multiple actors are committed to develop new alternatives that would not have been practicable through unitary action (Agranoff and McGuire 2001) and multiple actors will have greater resources and greater knowledge to tackle a problem. The network can also provide flexibility to adjust to complexities and uncertainties that occur during the process. Conflicts may arise between actors, but it is argued that the network develops their own ways of negotiating and overcoming conflict to create a consensus. Furthermore, when a decision is made, it is expected that the actors have developed a joint responsibility and will therefore put effort into implementing the policy (Sørensen and Torfing 2007).

However, it is inherent to wicked problems that knowledge may not be able to make a problem clearer. In a network, a plurality of actors stands for a plurality of perceptions and there is a chance that knowledge will be used as a strategy or as a way to exert power. For instance, they may produce research that supports their perception of the problem and their preferences, which is not constructive to solving the problem of uncertainty. Therefore, actors in a network may not be able to address the cognitive uncertainty, whilst they may struggle with the institutional uncertainty and may increase the strategic uncertainty. In this case, network management can be used to stimulate the opportunities that networks offer, in order to tackle policy problems and overcome any issues.

Other issues that some networks encounter are problems and outcomes that have a degree of risk embedded. Risk can be defined as:

> the possibility that an undesirable state of reality (adverse effects) may occur as a result of natural events or human activities.
>
> (Renn 2008: 98)

Risk refers to a situation in which something of human value has been put at stake and of which the outcome is uncertain. In academic literature, the term 'risk governance' is used to describe the governance process in which risk is managed through the collaboration of multiple actors. These different actors all have their own perception of risk. A risk manager needs to consider these different perceptions when deciding if a risk should be taken and what risk reduction measures are appropriate. However, there could be a tension between the 'facts' and the 'feelings' of risk. Some question if science should be the main determinant of making risk-based decisions, or if the science perception is equal to subjective perceptions of risk held by other actors (International Risk Governance Council 2005). Obviously, a wicked problem can include a risk, which means that knowledge about this risk is limited, increasing the complexity of decision making.

2.4.3 Actors and interactions

A governance network has a variety of actors, which originate from the public, semi-public, private and community sector. Which actors are included in the network is the result of the governmentality, which can be expressed through policies and regulations. In addition, the type of multi-level governance will also influence the network membership. Finally, the network constellation may also be the result of the problem

definition that requires certain actors to become involved or of the network interaction, for instance if an actor decides to leave the network due to conflict.

Actors may be individual actors and only represent themselves in the process, whilst others are composite actors, representing the organisation they work for. In addition, any actor can belong to other networks or normative circles.[14] The perception and preference of an actor is an individual factor, but is also influenced by membership. Individuals have causal power in their own right, but social groups possess causal powers that are greater than the sum of the individuals; this perspective is known as emergence theory (Elder-Vass 2010). The perception of an individual can be in conflict with that of their organisation or group. In addition, if the actor or organisation is part of other networks, interests may become incongruous. By regarding actors as being composite or belonging to other groups, one weakness of the dialectical model by Marsh and Smith (2000) is addressed, which was that in their model no distinction could be made between individual actors and groups.

The description of the actors in a network includes their characteristics and their resources, to determine interdependence. Actors are characterised by their interests, preferences, perceptions and resources. An actor's interest refers to what benefits this particular actor, which will influence their preference and strategy. Perceptions influence the actor's definition of the policy problem, what type of outcome they can visualise and how they see other actors. Resources are structural elements that exist independently from the actor, but it is up to the actor to identify and make use of resources. The actors' resources will influence the interdependencies in a network. Their resources can be, for instance, authority, financial resources, knowledge and labour that are present in their particular organisation. However, an individual's resource can also be a person's ability to cope with a network situation. This personal resource is similar to an actor's skill from Marsh and Smith's dialectical model (2000) and is an important part of an individual's agency, as it allows an actor to reach their preferred policy outcome.

One element that is implicit in this model is power. Power influences the capacities of actors to achieve desired outcomes (Morriss 2002) and this power is often not equally divided (Goodwin and Grix 2011). It is therefore important for actors to understand their own power, but also the power of others. Understanding your own power means

[14] A normative circle is a group of individuals who adhere to a shared social norm or rule, producing social power (Elder-Vass 2010).

that you understand how to use your agency to apply or change structures to achieve your goal. Understanding the other actors' powers means that you can predict how others can influence the outcome in a beneficial or adverse way (Morriss 2002). However, power is not readily identifiable; for instance, it cannot be directly derived from the resources actors have:

> One should not measure the resources as an accountant, but make a qualitative assessment of the actions open to the partners and of the dynamics of their games. It is equally indispensable to focus on the relationship as such and not on each partner's respective power. Even if one partner appears completely to dominate the other, the dependence remains reciprocal—no matter how absolute the right of life and death is held by masters over their slaves. Masters are dependent on their slaves' survival in order to retain lordship over them.
>
> (Crozier and Thoenig 1976: 562)

Identifying power in a network therefore goes beyond listing available resources or observing behaviour. Lukes suggests applying an agent-centred approach that not only considers the power agents exercise, but also the power that they do not exercise (Hayward and Lukes 2008). He argues that there are three dimensions of power. The first dimension entails the power to prevail over the opposition of other actors, which can be identified by examining overt behaviour in decision making. The second dimension entails the power to control participation and set the agenda. In a network, this includes the power to alter the network structure. The third dimension focuses on the power to influence the preferences and perceptions of other actors. An example of the third dimension of power is the conduct of conduct as discussed by Foucault (for instance 1991). To ensure that individuals and groups take decisions that are in harmony with government's ends, government influences behaviour by using technologies of self and technologies of power.

The third dimension of power also considers latent conflict and the 'real' interests of those excluded by the process (Lukes 2005). Even if power is not exerted, it can still act as a barrier to other actors, when they feel that they need to behave in a certain way to prevent another actor from showing their authority. This power is difficult for a researcher to identify:

> This third dimension of power is usually hidden from direct observation; it has to be inferred via the postulation of relevant counterfactuals, to the effect that but for the exercise of the power in question those subject to it would have thought and acted otherwise, in accordance with their 'real' interest.
>
> (Hayward and Lukes 2008: 6)

In these dimensions of power, structures play an important role. Power is not located in structures, but is the effect of structures. Power is not structurally deterministic, but there needs to be an agent with the choice to exercise this power. It can be presumed that the person who exercises power takes a conscious choice to do so and is aware of the consequences of their actions. Therefore, to locate power is to 'fix the responsibility for consequences held to flow from the action, or inaction, of certain specifiable agents' (Lukes 2005: 58). Furthermore, power is not limited to the network itself, as structures, 'real' interests and power relations outside the network can also influence decision making.

The actors' characteristics, interdependence, and if and how they use power all influence their interactions. On the one hand, an actor can use their skills and resources to create a collaborative working environment (Edelenbos et al. 2013). On the other hand, an actor can use their resources to exert power by limiting other actors or block decision making. In addition, the actors can design a decision-making process that is counterproductive. A slow process without progress causes inertia and no decisions are made. On the other hand, too much action or decisions made too fast can cause suboptimal outcomes (McGuire and Agranoff 2011). The network may also be too focused on being successful in their process and achieving cooperation instead of conflict, whilst producing poor outcomes. For instance, the *ex post* satisfaction might be high, but the problem might not be effectively or efficiently solved.

Furthermore, structures can affect interaction. By examining a network in the Thames Gateway, Brownill and Carpenter (2009) conclude that Type II governance causes too many different agencies to become involved, which complicates interaction and decision making. Moreover, Skelcher (2000) argues that due to governance and the process of hollowing out, an organisational and political fragmentation has taken place, which complicates matters of responsibility, accountability and authority. In addition, the political focus has shifted towards intractable problems cutting across sectoral and organisational boundaries, complicating decision making further.

However, actor constellation still plays a crucial role. If the actors' interests are compatible, it can be expected that the interaction will be characterised by cooperation, resulting in a policy outcome that actors are content with. If there are large discrepancies between actors, this could result in conflict and the lack of an agreed policy outcome. However, the actors' characteristics and their interactions are not necessarily constant, because throughout the process changes may happen that will affect the actors. For instance, actors can learn from experiences, or events may occur in the wider context.

Finally, a network may form a structure of its own when formal or informal rules for interaction are developed which are specific to that network. A strong network structure forms an institutional capacity, which allows the actors to share information, knowledge and understanding (Healey 1998) and leading to collaboration (Edelenbos et al. 2013), for instance, because trust is developed between the actors, or because imperatives are created to maintain the network (Toke and Marsh 2003). The network structure influences interaction and policy outcomes. As an example, developing shared values over the desired outcome stimulates joint decision making, but will also privilege certain policy outcomes (Marsh and Smith 2000). The network structure can also influence the wider context; when actors from a previous network meet in another network, they may adapt the old network structure.

2.4.4 Wider context

The actors and the network operate within a wider context composed of structures and agents. Structures are composed of formal institutions, informal institutions, or other structures, such as the political, economic, social, technological or environmental situation and events. Structures exist independently of people's interpretation and people will perceive these structures using their senses and their minds (Bhaskar 1975, Sayer 2000). Therefore, even though the actors in a network are all part of the same structural context, they might have specific perceptions and preferences derived from the policy field they work in, the organisation they work for or their individuality.

Part of the context is the governance structure or the governmentality. Through this structure a certain type of governance will be favoured, which can impact on the network structure and the actors within. The governance structure can for instance be characterised by Type I or II multi-level governance (Hooghe and Marks 2003, 2010),

which may determine the size of the network and the division of the actors' responsibilities. In addition, the level of hierarchical rule or the influence of market forces impacts upon the network. A political culture favouring network governance will influence the establishment of governance networks, whilst the actors, if they agree with this governmentality, will strive for cooperation and autonomous decision making at a distance from central government. These factors in turn affect the interaction between the actors and the outcome. Moreover, policy outcomes will affect the network governance debate. If networks are successful, this will reinforce the idea that network governance is the desired arrangement, but if they fail the arrangement may be undermined.

Structures are part of the 'real' world and may cause events or non-events to occur. These events are the result of structures or mechanisms being triggered, causing an observable effect. For instance, if weather, water and landform are triggered, extreme rainfall is created, causing a flood. Even though the structures are always present, it is the weather and flood event that people observe and find undesirable, thereby causing action to be taken. Therefore, even though the initial trigger is in a structure, agents matter as well, because structures cannot act, only agents can (Toke and Marsh 2003). Agents can affirm or reject structures, or sudden change and events can change the perceptions and preferences of agents, which will affect the outcome. Simultaneously, by their actions, agents can in turn shape structures as well. Therefore, agents and the wider context are in a dialectical relationship.

2.4.5 Policy outcome

Lastly, policy outcomes are the result of the decision-making process in the network. Actors may have differing preferences on what their desired outcome is. When an outcome is eventually reached, both the network structure and the wider structure can be affected. Firstly, a particular network outcome can change the existing network's membership or resources. Secondly, the policy outcome can change the broader context through any element, such as a change in regulations, a change in other networks or a change in the environment. Moreover, outcomes can change agents if they learn from experience or change their perceptions (Marsh and Smith 2000). Lastly, a policy outcome can change the policy problem, for instance by solving the problem, or changing the factors in the wider context that affect the problem.

2.5 Conclusion

This chapter discussed various strands of governance theory, resulting in the development of a theoretical framework that provides a method for analysing the functioning of governance networks. By applying this theoretical framework, the key factors that impact on FRM, which are derived from influences from structure and agency that are present in the governance network or in the wider context, can be identified. This theoretical framework will inform data collection and analysis of two cases of governance networks. However, before this takes place, the next chapter discusses how network governance of FRM has developed.

Chapter 3 Network governance of flood risk management

3.1 Introduction

This chapter addresses the first research question, which is: 'how has network governance of FRM developed?' The aim of this research is to explore the nature of governance networks in FRM in local planning processes in England; therefore the main focus of this chapter is on where the governance systems of FRM and spatial planning in England overlap.

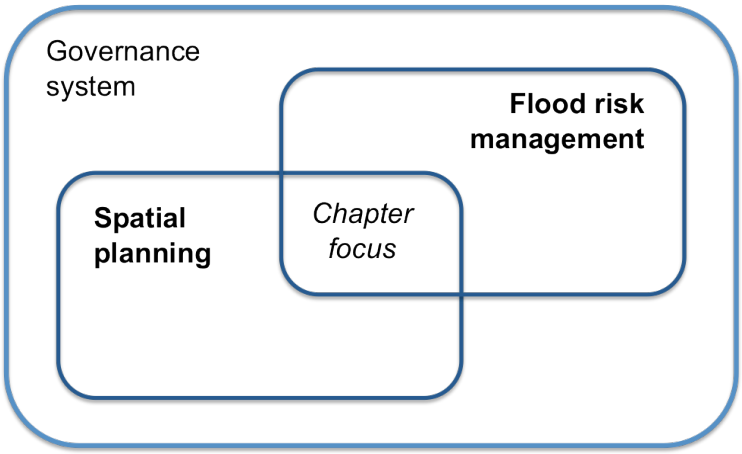

Figure 5: Governance of flood risk management and spatial planning

To do this, section 3.2 describes the development of FRM and spatial planning chronologically. Section 3.3 looks at the characteristics of the governance networks in FRM in more detail. This will provide a context for examining two cases of governance networks later in the thesis. Lastly, conclusions are drawn.

3.2 Governance of flood risk management and spatial planning

This section describes the development of FRM and spatial planning chronologically. It is divided into six eras, starting with the pre-war era and ending with the end of 2013. By describing the development of the governance system for FRM and spatial planning, it becomes clear how the two fields converged and how the shift from government to network governance took place.

3.2.1 The pre-1945 era

Flooding has always occurred as a natural process and people have always attempted to manage the impacts of flooding. For instance, historic cities were often established in advantageous areas near vital resources, such as water, but with development located in areas safe from flooding. An example is Tewkesbury with its historic core located on a hill (White 2010). Another early form of FRM took place in rural areas by draining land to create sufficient farmland for food supply.

At first, government was not involved in FRM, but that slowly changed over time. For instance, in 1427 one of the first regulations on FRM was created: the Sewers Act, which established the commissioners of sewers[15] appointed by the king. The commissioners levied drainage rates from land with defences or drainage systems. Drainage was a localised function, and as a result, a large number of organisations were in existence (Watson et al. 2009). As the population grew, draining agricultural land became more important, and in the 19th century, public money was made available to fund this. This continued into the 20th century (Bowers 1998). The power of central government in drainage increased in 1930, through the Land Drainage Act, when the commissions were transformed into catchment boards and Internal Drainage Boards (IDBs), which were under the control of central government (River Stour (Kent) Internal Drainage Board 2009).

In the meantime, the industrial revolution caused rapid changes in the landscape during the 19th century and a desire for government intervention grew. Population became concentrated in industrial towns, where industrial land use and housing were in close proximity. Development was market-led, and there was a lack of building control or regulations regarding sanitation, causing poor quality of life for residents and outbreaks of diseases. The desire for government interference into planning grew. In 1848, two Acts of Parliament were passed that restricted the freedom of landowners and development, whilst local acts gave councils the authority to set standards for housing and deal with unsanitary houses, but the scope and effect was limited (Duxbury and Telling 2006). Therefore, to increase the role of government in planning, the first Planning Act was passed in 1909, with further Acts in 1919 and 1931. These Acts authorised local authorities to prepare planning schemes for development land, set

[15] The term ‘sewers’ referred at this time to water drainage rather than sewerage.

standards of amenity and convenience, and control change of use in existing buildings (Duxbury and Telling 2006).

During the Second World War, the planning system developed further. A central planning authority was established and planning was formally given a role in state affairs through the Minister of Town and Country Planning Act 1943. The minister was responsible for developing a national policy that was aimed at the use and development of land. The framework of the modern planning system was established with the passing of the Town and Country Planning Act of 1947. As part of this Act, local authorities had to adopt development plans, and development was dependent on the obtaining of planning permission. The adoption of this system proved to be slow, as it would take over ten years after the Act for the minister to approve the first local development plans (Tewdwr-Jones 1997).

3.2.2 1946–1980

During the war, domestic food production contributed to Britain's survival, and after the war, self-sufficiency remained an important goal (Tunstall et al. 2004). Therefore, in the period after the Second World War until the 1970s, land drainage and flood defences were mainly used to protect agricultural land. However, their contribution to protecting urban areas was increasingly recognised (Penning-Rowsell and Handmer 1988). At the time, flood defences were characterised by hard engineering solutions with little regard for the natural environment (Tunstall et al. 2004). Nature was to be controlled; for instance, through the channelling of rivers and draining of wetlands. Therefore, FRM at the time was aimed at reducing the probability of flood risk, and as a result, the consequences of flood risk were reduced as well. There was no overall drainage strategy, as flood issues were addressed on a site-by-site basis.

In 1947, the Thames flooded, causing one of the worst floods England had experienced. That winter there had been much snowfall, and after a thaw set in during a period of heavy rainfall, the rainwater did not drain into the frozen ground, whilst snowmelt caused rivers to rise quickly. The floods that followed damaged infrastructure, farmland and more than 100,000 properties, at an estimated cost of between £3 billion and £4.5 billion at 2007 levels (Wainwright 2007). As a consequence, there was a public outcry to improve protection against flooding. The chief engineers of the catchment boards responded by demanding more financial resources to improve existing flood

defences and develop new ones. The action that was taken was in line with the paradigm of the time, which focused on finding engineering solutions by controlling the environment. In addition, the flood defences that were developed were mainly aimed at protecting agricultural land with protection of urban areas as a secondary benefit (Tunstall et al. 2004). Moreover, further changes were made in the institutional setting with the replacement of catchment boards by river boards in 1948 (National Archives 2012).

This period also signified the emergence of the first policies that embedded FRM in planning. As FRM had been aimed at agricultural land, there had been no restrictions on developing within floodplains and, as a result, prior to 1947 much development had been taking place within areas at risk of flooding (Richards 2007). In 1947, a series of government circulars was released to control development within floodplains. The circulars stated that planning authorities should consult with drainage authorities (river boards at that time) in order to identify which parts of a development could create problems with drainage. The planning authorities were responsible to set up an effective system of liaison with the authorities responsible for FRM (Parker 1995); therefore, the implementation of these policies were heavily dependent on the priorities of local government.

Another greatly damaging flood occurred in 1953 on the east coast of England. A committee was established that looked into the probability of a similar flood recurring, which recommended strengthening the flood defences to be able to cope with similar conditions that caused the floods of 1953. In addition, the committee reported on the flood risks in the London estuary and recommended developing flood defences there as well, which ultimately led to the Thames Barrier being built (Penning-Rowsell and Handmer 1988). Again, due to the engineering paradigm of the time, FRM focused on decreasing the probability of flooding by raising flood defences.

Some years later, attempts were also made to strengthen the liaison processes between planning authorities and water authorities by publishing further circulars on development in flood risk areas in 1962 and 1969. Again, planning authorities were responsible for controlling development and adhering to the circulars, meaning the levels to which the circulars were adhered to varied greatly per local authority (Parker 1995, Tunstall et al. 2004).

Concurrently, the institutional setting of the water sector went through another change when the Water Resources Act 1963 created river authorities, which took over powers from the existing river boards and introduced water abstraction permits. This institutional change was in response to a severe drought in 1959 and flooding in 1960. However, problems with managing water resources and the segregation of responsibilities for water and sewage treatment resulted in a large restructuring of the water sector through the Water Act 1973. The large number of river authorities was merged into ten regional water authorities, which were responsible for the whole water cycle, including water supply, sewage treatment and drainage.[16] Therefore, through the new Act, various water functions were integrated (Ofwat and Defra 2006). The regional water authorities remained under control of central government and they received funding to carry out flood defence measures, without the need for cooperation from local authorities (Watson et al. 2009). As a result, local authorities were not involved in any issues of drainage and flooding.

Meanwhile in the planning field in the early 1960s, there was a renewed discussion about the planning system, and in 1964, the Planning Advisory Group was established to review the development plan system. In 1965, they published their report, which led to the Town and Country Planning Act 1968 (Delafons 1998). With this Act, a new system of structure plans and local plans was introduced. Structure plans dealt with strategic issues and needed the approval of the Secretary of State (SoS);[17] but even though local plans had to conform to structure plans, they did not need the approval of central government (Duxbury and Telling 2006). This gave local government authorities some discretion in developing local plans, which was seen as a move away from the centralised structure of the planning system (Delafons 1998). This development was therefore the opposite to the FRM field, which was controlled centrally.

3.2.3 1980–1990

In an attempt to strengthen the role of planning in FRM, a new circular on development in flood risk areas was released in 1982, with the aim to stimulate interaction between the local planning authority and the water authorities and to prevent development in floodplains (Parker 1995, Tunstall et al. 2004). Research into the effectiveness of this circular was conducted by Penning-Rowsell and Handmer (1988) who found that in

[16] With the exception of 29 small, private companies that remained in existence.
[17] The Secretary of State replaced the minister in his duties.

practice, the influence of the water authorities was often limited. Their role was primarily advisory, but at the same time they also lacked the personnel to be able to respond to planning queries within the statutory 28-day time limit. The arrangement was considered too informal, which meant that planning authorities could prioritise employment-generating development over flood risks, whilst the water authorities did not have the power to stop development. In an interview, a planning officer felt that the circular was too weak and it needed additional formal agreements. Engineers from the water authorities expressed their frustration with development in floodplains, which subsequently required flood alleviation works paid for by government. This meant that private development was effectively subsidised, whilst it also prevented coherent FRM to take place (Penning-Rowsell and Handmer 1988). Therefore, even though circulars were released, much development still took place in floodplains and in areas that were known to flood (Penning-Rowsell and Handmer 1988, Tunstall et al. 2004).

Furthermore, in the 1980s the water industry became part of a wider process of privatisation, in which governmental tasks were transferred to private companies. In 1986, the first proposals were made to set up privatised water companies with a transferral of all tasks, but there was much criticism about giving private companies environmental regulatory functions. The plans were withdrawn, revised and resubmitted in 1989, through the Water Act 1989. The assets and personnel of the regional water authorities were transferred to limited companies, which would be responsible for water supply and sewage treatment. The ten private water and sewerage companies (WaSCs) would provide water to 78% of all connected properties in England and Wales (Saal and Parker 2001). In addition, three separate bodies were established to regulate water and sewage treatment: the National Rivers Authority (NRA), the Drinking Water Inspectorate and the Office of Water Services (Ofwat) (Ofwat and Defra 2006). The NRA became responsible for the quality of inland, coastal and underground waters, controlling pollution, the management of water resources, land drainage, flood protection and fisheries (National Archives 2012). Ofwat became mainly concerned with prices, profits and the quality of services (Saal and Parker 2001) and with regulating the WaSCs' investments. Even though central government lost some control through privatising the water companies, they still retained power by being responsible for these NDPBs, as well as providing some funding and setting legislation.

Upon establishment, the NRA started to develop ideas of sustainable water management. For instance, they identified a need for storm water source control, now

known as sustainable drainage systems, although it struggled to develop these in collaboration with local authorities (Howes 2007). As Howes, who worked at the NRA, described:

> While there was a great deal of progressive thinking on more sustainable ways of managing the water environment this was failing to make itself felt, not only with Local Planning Authorities but also within the more hidebound parts of the organisation.
>
> (Howes 2007: 23)

Therefore, the NRA did not make sufficient use of the planning system to achieve their goals on FRM. They had a reactive approach by responding to planning applications, which often did not contain firm recommendations and was written in scientific language that planning officers had trouble understanding and integrating into their reports. At that time, they were not yet proactive by influencing policy or development plans and as a result, they had difficulty implementing their vision (Howes 2007).

Concurrently, throughout the 1980s the influence of the agricultural sector in governmental affairs decreased, as a result of its diminishing contribution to the national economy. This meant that FRM for agricultural land became less of a priority compared to that for urban areas. In addition, environmental issues grew in importance, which meant that environmental effects of flood defences were now taken into account (Tunstall et al. 2004).

The planning system, in the meantime, was set for another institutional change. Procedures for approval and adoption of structure and local plans were again considered to take too much time.[18] From 1986, in Greater London and metropolitan areas the structure and local plans were replaced by unitary development plans, which did not normally require the approval of the SoS. Moreover, due to the Planning and Compensation Act of 1991, amendments to structure plans were no longer required to be submitted to the SoS (Tewdwr-Jones 1997). This development that started with the 1968 Act and continued throughout the 1980s and 1990s can be seen as a move away from rowing to steering, as central government loosened its reins. However, this does not mean that central government lost much power, because the SoS still developed national policies that had to be taken into account by local authorities. These policies were released through departmental circulars until 1988, when Planning Policy Guidance (PPG) was introduced. PPG did not have a statutory status, but Local Plans

[18] For instance, in 1988 only 20% of areas in England and Wales that were outside London were covered by a formally adopted local plan (Duxbury and Telling 2006).

had to be consistent with national and regional policies and any inconsistencies could be used by developers as grounds to outweigh the provisions of a Local Plan (Tewdwr-Jones 1997). Therefore, even though national policies were not statutory, they still greatly influenced Local Plan making.

3.2.4 1990–2000

In the field of FRM, in 1992 another circular was published on development and flood risk. It stressed that the NRA had only limited powers to prevent development and the planning authorities were expected to take up the responsibility. Central government expected the local authorities to 'use their planning powers to guide development away from areas that may be affected by flooding and to restrict development that would increase the risk of flooding' (DoE et al. 1992: para 4, in: Parker 1995: 358). To emphasise the importance of resisting floodplain development, it addressed how climate change would increase flooding. Furthermore, as a tool to prevent local authorities from permitting floodplain development, central government would no longer fund the upgrade or construction of defences necessary for new development in flood risk areas.

However, again it was felt that the circular was not effective in preventing floodplain development. According to Parker (1995), there was evidence that regular liaison did occur, but developments were considered in isolation, with no long-term view or attention to cumulative effects. In addition, information on flood risk from the NRA was imprecise and unreliable, making it difficult for planners to identify if proposed development would be at risk of flooding (Parker 1995).

Furthermore, central government wanted to create a single agency that would protect and enhance the environment and that would contribute to sustainable development. The Environment Act 1995 was passed, replacing the NRA by the Environment Agency (EA). The new EA not only took over the functions of the NRA, but also the functions of waste authorities concerning pollution and environmental protection.

One of the objectives of the EA was to improve the translation of sustainable development into practice. They improved their responses to planning applications by taking the needs of planning officers into account and developed a more proactive response by becoming involved in local and regional policies and plans (Howes 2007). Being involved in planning became much more of a priority for the EA, for instance signified in the 1997 study on best practice in liaising with planning authorities, which

recommended more consistency in consultation responses and more involvement in pre-application discussions (Environment Agency 1997).

During Easter 1998, major flooding occurred in Warwickshire, Northamptonshire and northern Oxfordshire, caused by heavy rainfall on saturated soil. These flood levels proved to be higher than the 1947 floods and, as a result, over 4000 properties and businesses flooded and five people lost their lives. Insured and uninsured losses were estimated at approximately £500 million (Horner and Walsh 2000). After the floods, the EA was criticised because many people had not received a flood warning. There were two reasons for the lack of flood warnings in some areas. Firstly, the EA had been in existence for two years when the floods occurred and it had not had time to change the fragmented flood warning system that was in place (Tunstall et al. 2004). Secondly, many flooded areas had not been considered to be at risk of flooding previously and in those areas no warning arrangements were in place (Horner and Walsh 2000).

As the floods had been damaging, there were calls for an inquiry and in response the EA commissioned an independent review to be carried out (Bye and Horner 1998). This review identified that, at that time, FRM relied on structural engineering solutions. A more holistic approach would be more effective, including various non-structural solutions, such as improvements in the identification of flood risk areas and in the flood warning system. As a consequence of this realisation, a new and improved national warning system was set up (Tunstall et al. 2004). Surprisingly and in contrast to earlier conceptions, the review found that planning authorities were sufficiently regarding the EA's advice to resist development in floodplains. The only exception was caravan parks; some large caravan sites were flooded with minimal warning and the largest loss of life took place here; therefore, regulations needed to be improved (Bye and Horner 1998).

During this decade, awareness of environmental limits and climate change continued to grow. The planning system became increasingly concerned for the environment (Vigar et al. 2000). In FRM, the environmental effects of structural flood defences were taken into account and climate change was included in future flood risk. Furthermore, non-structural measures were gaining popularity. FRM was now not just aimed at reducing the probability of flooding. Increasingly, measures were taken aimed at the consequences specifically. In addition, as awareness on climate change and the effects on flooding grew, FRM and the adaptation agenda developed together.

3.2.5 2000–2010

In the autumn of 2000, much of the UK experienced prolonged and above average rainfall, resulting in various flood events between October and December. These floods were much more widespread than the 1998 floods and affected many properties, but also caused railway closures (Kelman 2001). The floods resulted in much discussion concerning the cause and who was to blame (Richards 2007). For instance, after flooding in Uckfield and Lewes that cost £130 million and damaged over 1000 properties, the EA consulted an engineering firm to compile a report on the causes and impacts of flooding. The report concluded that even though most of the built environment in the floodplain was historic, some new development had taken place that had increased surface water runoff and reduced flood storage (Binnie, Black and Veatch 2001). This was a common situation, because although policy tools had been in place via the circulars, in practice, planning authorities found that the economic and social benefits of developing outweighed the costs of flooding (Richards 2007). In particular, if a local authority had no flooding experience in the past, flood risk would be a low priority, which was easily outweighed by benefits of development. In addition, costs may have been underestimated in previous decades, for instance by not taking intangibles such as health implications into account, but also by using wrong data to gauge flood losses between 1977 and 1988 (Penning-Rowsell and Handmer 1988). As a consequence, the effects of flooding may have been underestimated, tipping the scales in favour of development and revealing the true cost only after a flood took place.

These floods of 2000, which had come only two years after the previous flood event, were described by the Deputy Prime Minister as a wake-up call (Tunstall et al. 2004). Whereas the government found FRM and planning policies satisfactory after the 1998 floods, it was now decided to review these policies. As a result, PPG25 was published in 2001, which made flood risk a material planning consideration. It also introduced a sequential test to be carried out, prioritising development in areas at low risk of flooding. Development in floodplains was considered exceptional, although in some cases still possible. The EA had a lead role in advising on flood risk issues, but were not a statutory consultee. It was also agreed to monitor the implementation of PPG25 and review this policy in 2004 (Tunstall et al. 2004, Richards 2007).

Returning to the planning system, there had been concerns for some time about delays in adopting the development plans (McDonald 1997);[19] therefore, another fundamental change occurred through the Planning and Compulsory Purchase Act 2004. The 2004 Act replaced PPG with Planning Policy Statements (PPSs), which were material planning decisions that had to be taken into account by local authorities (Duxbury and Telling 2006). If a local authority decided to ignore a PPS, they had to have clear and convincing reasons to do so (DCLG 2008a). The Act also abolished structure and local plans and introduced a two-tier system of Regional Spatial Strategies and Local Development Frameworks (LDFs). LDFs, which are still in use, are composed of statutory and non-statutory documents. Statutory documents are called Development Plan Documents, which have to be submitted to the SoS for approval. Supplementary Planning Documents are non-statutory and do not have to be submitted to the SoS. They can provide further detail to policies in a Development Plan Document, but cannot be used to allocate land. Examples are master plans, design guides or development briefs. All documents have to be consistent with national policies (Duxbury and Telling 2006). Planning permissions and refusals have to be consistent with the LDF, but the SoS can revoke or modify planning permissions or call in planning decisions. In addition, when a planning decision is appealed, the SoS decides on the case.

There was also an important change in scope for the planning system. The new Act introduced a statutory duty of the planning system to contribute towards sustainable development, which went beyond traditional land use planning. The planning system became more proactive in strategically coordinating all interests and sectors involved in spatial development. This provided the opportunity for other sectors, including FRM, to become incorporated into planning.

In the meantime, the awareness of environmental limits and climate change had continued to grow steadily. For instance, there were debates on whether the 2000 floods were the signs of things to come (Tunstall et al. 2004). The effects of climate change on flooding were researched as part of the Foresight Future Flooding project, which concluded that flooding and flood losses were expected to increase under all climate change scenarios (Evans et al. 2004). In addition, the government developed a sustainable development strategy, containing five guiding principles to permeate through various policy fields: living within environmental limits; ensuring a strong,

[19] In 1997, 57% of local authorities had yet to adopt local plans, although 50% of those were in the inquiry stage (McDonald 1997).

healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly (Defra 2005b).

The issue of climate change also started to percolate through the planning system. Central government commissioned planning guidance on climate change in 2000, but the release of this guidance was delayed, due to the changes that were occurring in the planning system and the conflict between 'the traditional planning stance of discretion and enablement, as against the climate change community's arguments for urgent and authoritative action' (Wilson 2009: 128). The guidance was eventually published in 2004, but in the form of advice, which did not have the same status as a PPS (ODPM 2004). Later, climate change became a material consideration in planning decisions through the publication of PPS1 and a supplement on climate change (ODPM 2005, Wilson 2006b, DCLG 2007).

In the field of FRM, the government's guiding principles for sustainable development influenced policy through the development of a comprehensive approach for managing future flood and coastal erosion risk, called 'Making Space for Water' (Defra 2005a). The aim of this approach was to make FRM cross-sectoral, whilst taking environmental, social and economic implications into account. The consultation process for 'Making Space for Water' took place in parallel with a review of PPG25. It had become clear that development was still taking place in areas at risk of flooding against the EA's advice and PPG25 was replaced with PPS25 that included revisions and a practice guide[20] (DCLG 2006, 2008b). The EA became a statutory consultee through the Town and Country Planning (General Development Procedure) (Amendment) (No.2) (England) Order 2006. The EA now had to be consulted during the planning process for any development of land of one hectare or more, for development within 20 metres of main rivers, for development other than minor development in areas at risk of flooding, or for developments in areas with critical drainage problems. The EA also received a new power to issue a call-in direction.[21] If the local planning authority planned to grant an application permission that was contrary to advice given by the EA, the local planning authority had to notify the SoS. In that case, the SoS would decide whether the application needed to be called in.

[20] An update to the Practice Guide was released in 2009, followed an updated PPS25 in 2010.

[21] First determined in Circular 04/06 (Communities and Local Government): the Town and Country Planning (Flooding) (England) Direction 2007, which was later replaced by the Town and Country Planning (Consultation) (England) Direction 2009: Circular 02/2009.

In 2005, further flooding took place in Cumbria, caused by prolonged rainfall. In particular Carlisle, Appleby, Cockermouth and Keswick were affected, causing the deaths of three people and £250 million in damage (BBC News 2005, Met Office 2012). Again, in the summer of 2007, extreme levels of rainfall in a short time caused river, sewer and surface water flooding across England. In June, it was South Yorkshire and Hull which were mainly affected, whilst in July, Gloucestershire, Worcestershire and the Thames Valley flooded (Pitt 2008). These 2007 floods caused much damage; around 55,000 properties were flooded, 500,000 people had no water or electricity and 13 people were killed as they were attempting to cross or clear away floodwaters. In total, 14,500 households could not return to their properties after the water had retreated, and a year later, 4,750 households still had not moved back into their properties. The economic costs were estimated to be £3.2 billion (Chatterton et al. 2010). Insurers received 180,000 claims for damage to properties, businesses and vehicles, costing approximately £3 billion (Association of British Insurers 2008). In addition, the floods impacted on public health and welfare. In a study of the social impacts of the 2007 floods in Hull, where 8,600 properties were flooded, participants were asked to keep a diary over a period of 18 months. Diarists responded that the floods had caused much stress, leading to a range of physical and mental problems. Examples given were skin irritations, chest infections, and exhaustion and depression, which could manifest or remain many months after the flood occurred (Whittle et al. 2010).

Due to the severity of the floods, an independent review was conducted, which resulted in the Pitt Review (Pitt 2008). In this report, 92 recommendations were made on how to tackle flooding and how to adapt to heavy rainfall caused by climate change. For instance, the report identified that surface water flooding had been a large problem in the 2007 floods, but no authority was actually responsible for dealing with it. There was no clear coordination structure and responses to flooding were piecemeal and inadequate, causing confusion between authorities and the public. The report called for the EA to take on a strategic overview for all types of flood risk on a national level, whilst the local authorities should take the lead on local FRM. In addition, a new Act on FRM should be adopted that clarifies responsibilities.

Figure 6: The 2007 floods in England
Source: Pitt 2008: xix

Furthermore, the review examined the relation between planning and FRM. It found that, since 2000, 11% of new houses were built in a floodplain. In 2006, around 16,000 homes were built in high-risk flood areas. However, ending all development in floodplains or flood zones would not be realistic, as many areas that have high development demands are in flood zones, such as London. Moreover, flooding in 2007 also occurred in areas that were not in a floodplain, through surface water and sewer flooding. Simultaneously, the fact that around a quarter of the houses flooded were 25 years old or less meant that more regard to all sources of flooding should be taken during the planning process. PPS25 could help to achieve this, but removing the automatic right to connect surface water drainage of development to the sewer system would encourage sustainable drainage and reduce pluvial flooding (Pitt 2008).

In 2009, heavy rainfall again caused flooding in Cumbria, with Cockermouth and Keswick in particular being badly affected. Many properties and businesses suffered flooding, but the event is mostly remembered because of the death of PC Barker who was directing motorists off a flood-damaged bridge when it collapsed (BBC News 2009b). This event showed that the problem of flooding was still urgent and also had devastating consequences.

3.2.6 2010–2013

The government implemented some of the recommendations from the Pitt Review by adopting the Flood and Water Management Act 2010. This Act established Lead Local Flood Authorities (LLFAs) formed by the unitary authority or the county council. The LLFA became responsible for developing a local strategy to manage all types of flooding. The Act also required the EA to develop a national strategy for all types of flooding; this strategy was published in 2011 (Defra and Environment Agency 2011).

Furthermore, Schedule 3 of the Act strengthened the use of sustainable drainage in new development. Sustainable drainage systems (SuDS) are site-specific structures that aim to mimic natural drainage as close as possible. SuDS control the quantity of surface water runoff, but can also improve water quality by providing treatment, and enhance biodiversity and amenity. Examples are permeable paving, swales, basins, ponds and wetlands (Howe and White 2001, Woods-Ballard et al. 2007). Applicants must apply to SuDS Approval Bodies (SABs) to gain permission for the drainage system. For approval by the SAB, drainage must be designed to comply with the national standards (Defra 2011). After permission is granted, developers are allowed to start works and receive the right to connect to the sewer, whilst the SAB adopts and maintains the SuDS. However, there have been some issues with the pending implementation of Schedule 3. For instance, the Home Builders Federation was concerned about the costs to developers and claimed it would present a significant risk to the delivery of new houses. Some local authorities also expressed concerns on the cost of maintaining and adopting SuDS. This has caused a delay in the implementation of Schedule 3 (Booth 2013), which is expected to take place in 2014[22] (Defra 2013d).

In the same year as the Flood and Water Management Act 2010, the planning system underwent a major reform led by the new coalition government comprising the Conservatives and the Liberal Democrats. The debate on the planning system was similar to those held in the past, where the system was perceived to be too slow and too complicated. According to the coalition programme, the new government set out to 'end the era of top-down government' (HM Government 2010: 11) and replace it with a bottom-up approach, with more involvement of local people in the development and land use of their area. For instance, the regional tier of government was abolished and the Regional Spatial Strategies were no longer considered relevant. The government

[22] Predicted implementation date as of December 2013.

also set out to simplify the planning system and stimulate development by replacing the PPSs with the National Planning Policy Framework (NPPF) and technical guidance. The NPPF, which is currently still valid, aims to develop a presumption in favour of sustainable development. In its definition of sustainable development, the NPPF builds on the UK sustainable development strategy from 2005, but also includes the three dimensions of sustainability: economic, social and environmental. The planning system is expected to contribute to a strong economy, to support strong communities and to protect and enhance the natural, built and historic environment (DCLG 2012a). In addition, the technical guidance contains detailed policies, such as on FRM, which are similar to those in PPS25[23] (DCLG 2012b).

The first three months of 2012 were very dry compared to averages, but in April rainfall increased. In fact, the months April and June were the wettest since records began in 1910 and many locations in the UK received more than 135% of the annual average of rain (Met Office and JBA Risk Management 2012, Met Office 2013). The continuous rainfall saturated soils and produced a combination of fluvial, pluvial and groundwater flooding. In addition, there were intense thunderstorms, producing much water in short periods of time. One of these events occurred in the area around Newcastle upon Tyne on 28 June. In two hours 50 mm of rain fell, equivalent to the expected rainfall of the whole month of June. These short bursts of rain caused rapid pluvial and sewer flooding. This event was unique; according to a survey conducted by Newcastle City Council, 66% of those whose houses had flooded had never experienced flooding before (Newcastle City Council 2013b). However, there are also concerns that climate change may increase the occurrence of these extreme weather events in the future. The Adaptation Sub-Committee states that even though it is not possible to attribute current weather events to climate change, 'the latest climate models tell us that extremes of the kind seen this year [2012] are likely to become more common in the future' (Adaptation Sub-Committee 2012: 6). Moreover, Peterson et al. (2013) examined the events in more detail and found that natural variability played an important part, but human influences on sea surface temperatures and low levels of Arctic sea ice may have contributed as well. Therefore, it is likely that extreme rainfall and rapid flooding will occur more frequently in the future.

[23] An exception is that the NPPF includes the use of SuDS, but does not explain these in as much detail as PPS25 did, because they are catered for in the Flood and Water Management Act 2010 and the national standards that are to be published.

Lastly, in recent years debates on flood insurance have resurged. Flood insurance is perceived as a non-structural approach to FRM by managing the consequences of flooding and improving recovery. In addition, the cost of insurance can promote risk reduction (Jha et al. 2012), for example, if a policyholder takes flood risk measures to reduce their premium or if developers only build houses outside flood zones, ensuring they are insurable and therefore saleable. In England, flood insurance is included in domestic property insurance provided by private insurance companies. Most of the cost associated with repairing damaged property is therefore borne by private insurance, instead of compensation provided by the government. This arrangement is the result of an agreement between the government and the Association of British Insurers (ABI) (Lamond et al. 2009). In this agreement, called the Statement of Principles, insurance companies have agreed they will continue to provide insurance for properties at risk of flooding if the government reduces flood risks (HM Government and Association of British Insurers 2008). The statement was initiated as a temporary measure to cover properties at risk of flooding until the risk was reduced after flooding in 1998 and 2000. The statement was revised over time (Association of British Insurers 2010), with the most recent one originally running out in June 2013.

Negotiations for a new agreement proved to be difficult. The insurers felt that flood risk had not reduced over time and that the government was not doing enough to abate such risk. As houses were still built in flood risk areas, they stated that the planning system should be more rigorous and take insurability into account. It should direct development away from areas of high risk, and when development is necessary, vulnerability should be reduced through flood-resilient design and flood alleviation schemes (Association of British Insurers 2010). Therefore, the insurers threatened to remove cover for properties at risk of flooding (Lamond et al. 2009), which would render insurance very costly for houses in flood risk areas. The ABI estimated that 78% of the properties in areas of high flood risk paid less insurance than they would if the risk was fully reflected in the price. The estimated under-pricing was 165% on average (similar to £430 at 2010 prices), but in some cases the price was estimated to be more than 500% lower that it would have been if it was risk-based (O'Neill 2011).

The government, on the other hand, felt that the NPPF was a strong enough policy to avoid unnecessary building in floodplains (Defra 2012) and continued to negotiate a new agreement with the ABI. As a result, plans were presented to establish a not-for-profit entity, named Flood Re, to provide flood insurance for houses in flood risk areas.

The concept is based on capping the insurance cost for houses at risk of flooding based on council tax band. Houses built after 2009 are excluded in order to deter further development in flood risk areas. The insurers pay into the new fund and pass on this cost to all customers. Therefore, the cost of insuring houses at risk of flooding is distributed amongst all policyholders in Britain. The new agreement was consulted on, and the Department of Environment, Food and Rural Affairs (Defra) was reviewing the proposals as of December 2013 (Defra 2013a, 2013b).

To summarise this section, key events and policy developments that occurred in FRM are listed in Appendix B. In addition, the current regulations, plans and policies on FRM and planning are detailed in Appendix A.

3.3 Governance networks of flood risk management

The previous section described the development of FRM and spatial planning chronologically. This section continues with the examination of the development of network governance in FRM and the functioning of governance networks by applying the theoretical framework (see section 2.4). Firstly, the formation of governance networks is discussed, followed by the policy problems governance networks may encounter, the actors that may be present in these networks, the wider context in which the network is set and the outcomes of FRM that have been observed in the past. Lastly, conclusions are drawn, exploring the key factors that may affect FRM.

3.3.1 Development of network governance in flood risk management

As previously discussed, the nature of FRM has developed over time. Until the 1970s, FRM was mainly a measure to control drainage in order to improve agricultural land. It was aimed at controlling nature by using engineered solutions. In recent decades, FRM started to change as awareness grew of environmental effects and the need to adapt to the changing climate. Flood events, such as in 1998, 2000 and 2007, created more urgency to manage flood risk and acted as a stimulant for change. Currently, the nature of FRM entails accepting but also managing flood risk through a combination of structural and non-structural techniques (Tunstall et al. 2004). One non-structural measure is spatial planning. Understanding of the effects of land use on flood risk has increased, and as a result, FRM is now to a significant extent decided within the planning system.

The planning system has experienced various developments as well. Firstly, the planning system changed from a land use system to a spatial planning system that coordinates different sectors. In addition, there has been a growing awareness of climate change and environmental limits. Secondly, the current planning system is founded on a neo-liberal governmentality. Network arrangements are included in planning through partnerships and various forms of formal and informal networks (Tewdwr-Jones 2012), which facilitate decision making at a distance from central government. Central government is stimulating the involvement of communities and the rate of development by increasing market freedoms (Davoudi 2011). The role of planning is to facilitate growth and overcome any barriers that may inhibit this, thereby increasing the influence of private actors in planning. As a consequence, multiple actors are involved in the planning process, such as planners, various departments and sectors from local government, NDPBs, applicants and communities. These actors have some discretion to make decisions and interact with each other in governance networks in order to make planning decisions.

The move towards spatial planning and the increasing influence of communities is reflected in national rules and guidance on engagement with the public and involvement of authorities in the planning process. However, in planning practice the level of involvement differs (for a typology on community participation, see Arnstein 1969). At times, participation is restricted to sharing ideas, whilst in other cases stakeholders are directly involved in shaping policies and making decisions (Tewdwr-Jones 2012). Networks may be more ideological in nature, focusing on the process of sharing ideas and creating an integrated vision. Networks may also be more functional in nature, only 'ticking the boxes' on consultation, but without the aim to create a synergy and form a shared solution.

The predominant governmentality influences the type of governance networks that are created. For instance, the involvement of the community in planning through neighbourhood planning has been developed by government as an aim to meet government objectives:

> In the context of neighbourhood planning, the agency of individuals is mobilised by the construction of a new identity as a member of neighbourhood forum. Their capacity is then redeployed to achieve government's objectives which are currently centred on increasing the rate of house building and development in general.
>
> (Davoudi and Madanipour 2013: 555)

Even though more power to local governments and communities should stimulate planning decisions being made in local networks, central government still influences planning practice directly and indirectly (Vigar et al. 2000, Moore 2007). In the example of neighbourhood planning, the residents are limited in their decision making by mandatory compliance with higher-level spatial plans and rules that do not allow the rejection of development (Davoudi and Madanipour 2013). Using Foucault's concepts, the government uses technologies of agency and of power to achieve their ends. Therefore, planning has moved towards a hybrid system, in which central government encourages networks for policy formation and implementation and increases the influence of the market, but at the same time remains its influence through hierarchy (Brownill and Carpenter 2009). Networks play an important part in planning, as both the nature of planning and the governance system enable network arrangements, but these networks operate within a framework of hierarchy and market influence.

FRM in itself has also experienced a shift from government to governance and has been subject to processes of decentralisation, agentification and privatisation. Throughout history, FRM has been the responsibility of specialised authorities, often under control of central government. In the 1980s, privatisation caused water supply and sewerage to become the responsibility of private companies, whilst the EA was given a strategic overview of water quality and FRM. In addition, local authorities gained responsibility for all sources of local flooding through the Flood and Water Management Act 2010. Furthermore, the EU started to create directives for its member states on the topic of water management and flooding. Therefore, FRM is a form of multi-level governance, with decisions made at the EU, central and local levels. FRM has a complex structure of legislation, policies and plans required by the EU and central government.[24] As a result, the local level is required to develop multiple plans to manage flooding, which often overlap. This means that for authorities, developers and the public it can be a confusing exercise to identify a local authority's stance on flooding and how this is to be managed.

To be more specific, FRM is a Type II governance, in which responsibility and accountability is dispersed amongst multiple authorities on various spatial levels (Hooghe and Marks 2003, 2010). These responsibilities are set in legislation, which has caused the flexibility usually associated with this type of governance to be diminished. An example is the inability of any authority to take responsibility for dealing with the surface water flooding in the 2007 floods in England, which had to be resolved by

[24] This structure is explained in Appendix A.

creating new legislation through the Flood and Water Management Act 2010. However, some new responsibilities set out in the Act are incongruent with the interests of some actors, such as developers, causing reluctance and delay in adopting new legislation on sustainable drainage. In addition, the Type II governance increases the complexity of decision making as more liaison and negotiation between authorities is needed. It can also frustrate communities and individuals who are experiencing flooding when they feel that the local authority has not done its duty in protecting them against flooding (Butler and Pidgeon 2011); when they have an issue that needs resolving but are referred from one authority to another; or when no authority is able to address their concerns.

In addition, FRM can also be seen as being part of a neo-liberal climate that shifts responsibility from the state to others. FRM within planning has become the responsibility of local authorities, whilst the developer is responsible for assessing, mitigating and funding flood mitigation for proposed developments. Central government is also changing funding for FRM by increasingly seeking partnership funding for new flood schemes (Defra and Environment Agency 2012) and by making £5 million of funding available for communities to arrange and realise local FRM schemes (Defra 2013c). In addition, flood damage is covered by private insurance, meaning that central government does not provide compensation after flood events. It is the citizen's responsibility to ensure their property is adequately insured against flood losses. Therefore, central government is passing responsibility and the financing of FRM to others. Moreover, individuals are encouraged to live with a flood risk (Butler and Pidgeon 2011). This emphasis on individual responsibility is an important element of neo-liberal governmentality, but is often referred to as 'resilience' by government. Even though it has not been made clear what this resilience entails (Davoudi 2012), there is a risk that when resilience becomes hegemonic or is over-emphasised, it may lead to 'social Darwinism' and 'survival of the fittest' (Davoudi and Madanipour 2013: 557).

In conclusion, governance of FRM takes for an important part place on the local level. Individuals are responsible for protecting against any future flood losses and are increasingly being encouraged by the government to manage local flood risk. In addition, private developers have the onus of assessing and mitigating flood risk on site. The local authority is responsible for managing flood risk in the area, whilst cooperating with other authorities that have responsibilities for FRM and thereby forming

governance networks. These networks operate within guidelines set by central government through policies and targets, in order to govern the governance. Moreover, this neo-liberal governmentality is also present in the planning system, where decisions are taken at a distance from central government, with an increasing role for private investment and responsibility. At the same time, central government keeps control through legislation and policy. Therefore, decisions on FRM in the planning process are taken within governance networks that are influenced by hierarchical and market arrangements.

3.3.2 Formation of governance networks in flood risk management

Governance networks in FRM can be formed for a variety of reasons. Firstly, a group of actors may interact as a result of a flood event that created an urgent policy problem they wish to address. Secondly, the network may be formed voluntarily; for instance, by a group of actors who wish to develop a flood risk measure together. Thirdly, a network may be the result of direct or indirect governmental direction. An example is the involvement of statutory consultees in the planning process, thereby creating a network of actors who interact to make decisions on FRM.

New development regularly takes place within areas at risk of flooding, which means that in these cases, governance networks are formed to manage flood risk as part of the local planning process. According to the Adaptation Sub-Committee (2011, 2012), approximately 12,000 to 16,000 new houses were built in flood zones each year between 2000 and 2009. Development inside floodplains grew by 12% between 2002 and 2012, compared to an increase of development outside floodplains of 7%. An explanation for this might be development pressure in floodplains, as some areas with the greatest demand for housing and development also have large areas at risk of flooding, such as the south of England and London in particular (Howe and White 2004).

3.3.3 Policy problems concerning flood risk

In 2008, it was estimated that 5.2 million properties in England, which equates to one in six properties, were at risk of flooding from rivers, sea or surface water (Environment Agency 2009c). The problem of flooding and flood risk is therefore current and real, but is also likely to worsen in the future as a result of climate change. According to figures

by the Intergovernmental Panel on Climate Change (IPCC), climate change is already noticeable through an increase in global land and ocean surface temperature by approximately 0.85ºC over the period between 1880 and 2012. Additionally, snow and ice in certain regions are melting, the average sea level has increased and temperature extremes and wind patterns are changing (IPCC 2007b, 2013). Around the UK, the sea level has risen approximately one millimetre per year in the 20th century, whilst temperatures in central England have risen by 1°C since 1980. The annual average of rainfall has not changed, but although seasonal rainfall is highly variable, there seems to have been in an increase of precipitation in the winter and a decrease in the summer[25] (Jenkins et al. 2009, Murphy et al. 2010).

According to the IPCC, changes in the climate system have been caused by humans, for instance through the increase of greenhouse gas concentrations (IPCC 2013). Even if climate change is mitigated, its effects will continue in the future. Future predictions are that the sea level is expected to rise between 13 and 76 cm by 2080 (high confidence) and that storm surges may increase (low confidence). This not only affects coastal flood risk, but rising sea levels may also cause groundwater flood risk to increase (Rotzoll and Fletcher 2013). Furthermore, a rise in peak river flows between 7% and 60% and an increase in rainfall intensity between 15% and 30% by 2080 are predicted (Adaptation Sub-Committee 2012), impacting on fluvial, pluvial and sewer flooding.

As a consequence, the risk of most types of flooding is expected to increase in the future. This will affect the built environment: not only does it raise the risk of areas near the coast or in floodplains, it also makes settlements vulnerable to flooding caused by intense rainfall overloading sewers and drainage systems. Surface water flood risk is not easily identified and some areas not currently at risk may be in the future. In addition, once identified, the risk is also difficult to manage (White 2010).

It is estimated that the number of properties at significant risk of river flooding will rise from 230,000 currently to up to 580,000 in 2080, excluding population growth. Coastal flood risk will increase from 100,000 properties currently to up to 570,000 in 2080, purely due to climate change (see Table 1 on page 3). Population growth in areas at risk of flooding will increase these figures still further (Adaptation Sub-Committee 2012).

[25] Largest changes in winter precipitation: increase of up to 33% in the west of the UK; small decrease in Scottish highlands. Wettest day of winter: no change in parts of Scotland to a 25% increase in parts of England. Largest changes in summer precipitation: decrease of 40% in the far south of England and no change over northern Scotland. Wettest day of summer: decrease of 12% in southern England to an increase of 12% in parts of Scotland (Murphy et al. 2009).

However, there is much uncertainty surrounding the severity of future flood risk (IPCC 2012). As flood risk is a local to regional effect of climate change, there is great difficulty gathering evidence on this small scale, whilst there is no agreement either on the evidence that has been collected:

> There is limited to medium evidence available to assess climate-driven observed changes in the magnitude and frequency of floods at regional scales because the available instrumental records of floods at gauge stations are limited in space and time, and because of confounding effects of changes in land use and engineering. Furthermore, there is low agreement in this evidence, and thus overall low confidence at the global scale regarding even the sign of these changes.
>
> (IPCC 2011: 6)

Moreover, assessing the probability of flooding is of limited usefulness in FRM:

> Whilst information on recurrence intervals can be of use in providing a retrospective indication of the relative strength of an event in comparison to past floods, its veneer of scientific certainty regarding *future* risk should be viewed as illusory. In reality, the urban system is subject to such significant variability that its value in aiding strategic decision making is actually of limited value.
>
> (White 2010: 45; emphasis in original)

Flood risk does not only regard the probability of flooding, but it also considers the consequences (Tunstall et al. 2009). Flooding can have economic, environmental and social implications. Firstly, damage to properties, infrastructure, crops and the loss of business has an economic cost. Secondly, floodwater and the potential pollution caused by sewage or chemicals can adversely affect flora and fauna. Lastly, flooding can have severe and lasting impacts on people's health and wellbeing. Physical effects of flooding, such as shock, virus infections and headaches usually occur temporarily, but psychological impacts can be long lasting, most commonly causing depression, anxiety, stress and sleep problems (Tunstall et al. 2006). The annual cost of coastal, fluvial and pluvial flooding is expected to increase from £1 billion currently to between £2.4 billion and £11.6 billion annually by 2080 (Environment Agency 2009e, Adaptation Sub-Committee 2012).

Planning can exacerbate the problem of flooding. Bad planning has the potential to raise the probability and consequences of flooding. For example, development in floodplains cause a loss of water storage, whilst drainage systems that drain water into sewers or rivers can increase flood risk elsewhere (Howe and White 2004). Moreover, development and urban creep cause a loss of land through which rain may have been

absorbed. In an urban area, 30% to 50% of rainfall on a paved area turns into runoff, meaning that any development could increase surface flood risk. Currently, 7% of the surface area in the UK is urbanised, but 23% of this urbanised area includes open space. However, it is estimated that every year, there is a 0.1% increase in impervious surfaces and the potential national increase in urban area by 2080 could be between 7.5% and 30% (Evans et al. 2004).

There also needs to be caution that solutions aiming at flood risk and climate change adaptation to abate the problem in the short term may exacerbate flood risk in the long term (IPCC 2011). Parker (1995) has named this consequence the escalator effect. When a new flood defence has been constructed, the area is safer, expected flood losses are lower and the desirability of the area is increased. This may stimulate more development to take place in the area. If extra development takes place and if the flood defence is breached, the consequences will be much larger than before construction. Moreover, flood defences are usually designed with a protection level justified by existing development. The cost-benefit analysis does not take future development into account, and any new development will require a higher level of protection. If the flood defence is upgraded, this may activate the escalator effect again. Placing restrictions on development in flood zones in order to counteract development pressure may prevent the escalator effect.

The problem of flood risk is dependent on many uncertain factors and the relationship between these factors and flood risk is unknown. As a consequence, in terms of policy making, the problem of flood risk is wicked, surrounded by uncertainty on the nature of the problem, problem definition and solutions (Van Bueren et al. 2003). Current and future flood risks are not easy to predict. Flood risks are calculated using data and models, but data is limited and at times not accurate or detailed enough, whilst models are simplifications of reality and cannot predict flood risk exactly. Moreover, different models produce different results. Finally, knowledge on flood risk also changes when a flood occurs that was not expected.

Wicked problems also have no clear end (Rittel and Webber 1973), which is an issue with flood risk as well. Flooding will always occur and there will always be properties at risk of flooding. The difference is whether we can predict the probability and consequences of flooding, as well as deciding what risk we find acceptable. Also, how we protect against flooding has changed over time, from protecting against water in the

past to living with risks currently. This approach may be adapted again in the future, when perceptions or solutions to flood risk change. Moreover, flood risk is a long-term problem, but planning decisions are often taken with a medium term in mind. Decisions taken now include predictions of climate change in the far future, but at the same time these figures are uncertain. It can also be difficult to envisage how a development may in the future suffer under the consequences of a flood.

Flood risk's relationship with climate change aggravates its wicked character. Climate change is a highly complex and wicked problem for multiple reasons. Knowledge about the nature of climate change is uncertain and contested, including the effects of climate change on flooding. In addition, there is much institutional uncertainty, with various decisions on a problem taken in different policy fields or governmental levels (Van Bueren et al. 2003). Policy formation and implementation on climate change takes place in multiple policy sectors, such as water management, energy and spatial planning, and in several spatial levels, from international to local. This increases the complexity of climate change adaptation, even more so because the emerging field of adaptation lacks a structured policy domain. There are no clear goals, solutions or responsibilities for adapting to climate change, which complicates implementation (Termeer et al. 2012). Moreover, there is often a mismatch in spatial and time horizons between policy makers and climate change research. Plans and policies are designed for a much shorter term than climate change scenarios, whilst policy makers may struggle with the lack of knowledge on the precise impacts of climate change in their local area (Wilson 2006a).

This wicked nature of flood risk will affect the actors in a network addressing this problem. Flood risks have a great impact on the location, viability and layout of development, but there is uncertainty surrounding calculations and outcomes of current and future flood risk. This means there is room for different applications and interpretations of data and models, whilst various actors calculate flood risk for varying purposes. The EA has much expertise on flood risk and uses its own models and maps. Developers are obliged to assess flood risk in their development and therefore have the opportunity to calculate flood risks as well. Local authorities have often lost in-house drainage expertise through privatisation, budget cuts and outsourcing (Porter and Demeritt 2012) and may have difficulty interpreting technical information, especially when two parties disagree on figures. Knowledge on flood risk can therefore provide actors with power and they will produce this knowledge to support their interests.

Finally, the definition of the problem of flooding varies between parties (Tunstall et al. 2009); for instance, between the EA, which only considers flooding; the local planning authority, which considers it as part of sustainable development; the developer, who sees it as a barrier to development; and the community, who consider the impacts a flood may have on their lives. In the case of FRM, it is not just flood risk that is uncertain, but there are also differing opinions on the level of acceptable risk. Moreover, the actors can change their perception of the policy problem during the decision-making process.

3.3.4 Actors in governance networks in flood risk management

There is a large variety of actors involved in managing flood risk. These actors do not function in isolation within the governance network. They have perceptions of each other, may have interdependencies and some interact with each other regularly. Therefore, they exist in complex interrelationships within and outside governance networks. However, for reasons of clarity this section describes the key actors individually. An overview is given in Appendix C and the current rules, regulations and policies made by some of these actors, which is referred to in the text, are included in Appendix A.

European Union: The European Commission has adopted two directives that concern FRM, the Floods Directive and the Water Framework Directive, which have been transposed into British law. Therefore, the EU's main influence is through these transposed laws. In some cases the EU also provides regional funding that could be directed towards projects that manage flood risk.

Central government: Defra forms policy on FRM and is also the department to which the EA is responsible. Defra has no operational powers and therefore relies on other authorities for the implementation of policy. The Department of Communities and Local Government (DCLG) forms planning policy, which also includes FRM. Local authorities adhere to national planning policy and law and the SoS can in some cases decide on planning applications. Interests between these departments can conflict, just as development and flood risk can conflict, which can prevent integration of policies. Moreover, a change in government after an election often causes changes in policies.

Local government: The planning department has some discretion in deciding on planning policy and planning applications, but they have to comply with national law

and policy. Under current planning policy, planners make decisions with a presumption in favour of sustainable development, taking economic, environmental and social aspects into account. Flood risk is one of the issues considered. As councils have often lost in-house drainage expertise, they use the technical expertise of the EA (Porter and Demeritt 2012), but planners also have to interpret the EA's advice and balance it against other contributing factors to sustainable development. Flood risk could be viewed narrowly as an environmental factor, whilst local authorities give priority to economic and social benefits of development. On the other hand, it could be viewed more broadly, considering the effect a potential flood has on the economy, society and the environment, thereby increasing the role it plays in sustainable development.

Moreover, the planners' context is political. For instance, the elected members of a council also have influence over decision making in the council. In the case of planning, councillors will decide on major or controversial planning applications in the planning committee. The councillors represent the local people and therefore their decision may be incompatible with the advice of planning officers.

The Environment Agency: The EA is an NDPB and a statutory consultee for local policies and for certain planning applications. They can object to a development on flood risk grounds and have the power to use the Flooding Direction if their objections are not resolved.

The EA as an actor has inherited the technical and apolitical characteristics of their predecessors. FRM in the past was relatively self-governing and isolated from other policy areas, causing decision making to be relatively stable (Maloney and Richardson 1995). For example, the NRA was known for being very technical and not communicating well with other authorities and communities. When the EA was established and many of the employees transferred, problems communicating with planners remained, who experienced the EA as a technical, scientific and regulatory authority (Davoudi 2000). When the EA's role in planning increased, the planning officers felt that the EA did not understand that planners had to consider wider sustainability issues. Instead, the EA 'reduced sustainability to a black and white issue [where] planners must be mad to allow developments in the floodplain' (Porter and Demeritt 2012: 2370). The EA tried to improve their relations with planning authorities (Howes 2007), but at times negotiations between planners and the EA remained difficult, which was expressed in the number of objections the EA made to planning

applications. The introduction of policy and legislation, such as PPG25 in 2001, PPS25 in 2006 and the Flooding Direction in 2007, may have caused the number of objections to rise, but in recent years, there has been a reduction (Figure 7).

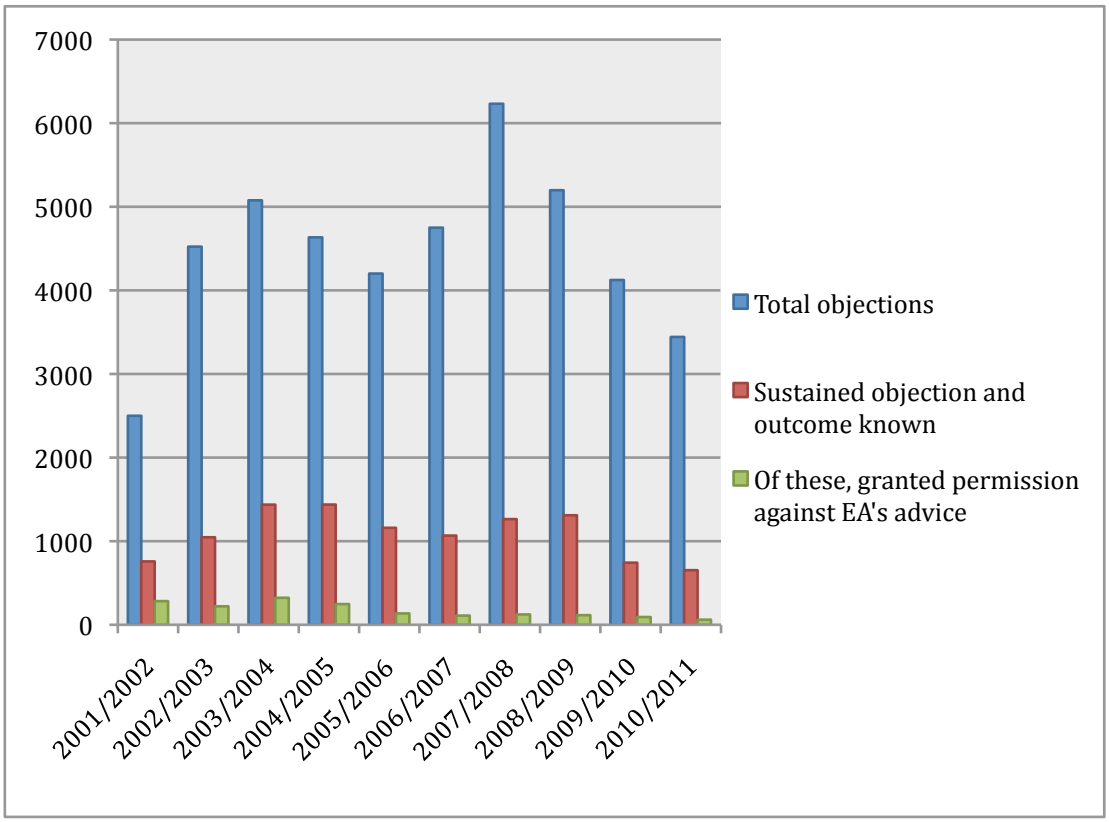

Figure 7: Objections to planning applications by the Environment Agency

Source: Environment Agency 2009c, 2010, 2011, 2012b, Porter and Demeritt 2012

Legislation and policy on FRM – in particular the Flooding Direction – is an important resource for the EA. They use this resource to exercise power over other actors, placing more pressure on negotiating parties to resolve any outstanding issues, causing a reduction in applications decided against the EA's advice. In their 2010–2011 annual report on development and flood risk, the EA stated that the introduction of the direction had lengthened discussions with planners and as a result improved the quality of developments and the supporting information submitted with proposals. When the EA objected to an application, this objection was usually resolved. When the EA sustained its objection, most of the cases were either refused or approved in line with their advice; only 9% of the planning outcomes were against their advice (Environment Agency 2012b). Most of these applications are referred back to the local authority to

make a decision, but in some cases the application is called in and decided upon in a public inquiry.[26]

Year	Referred under Direction and resolved	Of which local planning authority decided and approved against advice	Of which called in and approved against advice
2007/2008	9	6	0
2008/2009	15	5	2
2009/2010	4	1	0
2010/2011	2	0	1

Table 2: Major planning applications on which Flooding Direction was used
Source: Environment Agency 2009c, 2010, 2011, 2012b

Water and sewerage companies: WaSCs are responsible for foul and surface water sewers. Through Schedule 3 of the Flood and Water Management Act 2010 they will become statutory consultees for drainage system applications. If they own reservoirs holding over 25,000 cubic metres of water above natural ground level, they will be consulted in local spatial policy as well. The WaSCs have a duty to prevent flooding if they can be reasonably expected to do so, but what is considered reasonable is not detailed (Johnson and Priest 2008, BBC News 2012).

In addition, their interest in sustainable drainage is increasing. As more development takes place, the existing sewer system is placed under pressure. To prevent flooding, but also to prevent pollution through Combined Sewer Overflows (CSOs), WaSCs are seeking to reduce the amount of rainfall going into combined sewers or are

[26] In 2007/2008, eight applications were referred back to the local authority and one application was called in by the SoS, but was withdrawn by the developer. In 2008/2009, 13 applications were referred back to the local authority and two applications were called in. For 2009/2010 and 2010/2011 this division is not provided (Environment Agency 2009c, 2010, 2011, 2012b).

disconnecting surface water sewers.[27] Therefore, they are becoming more active in assessing flood risk from sewers and researching forms of sustainable drainage.[28]

Internal Drainage Boards: IDBs manage water levels in areas of special drainage need. There are 120 IDBs in England, either in broad open areas of lowland or within the floodplains of rivers. Most of the IDBs are located within Cambridgeshire, Kent, Lincolnshire, Norfolk, Nottinghamshire, Somerset and Yorkshire. Under the Land Drainage Act 1991, IDBs exercise a general power of supervision over all matters relating to water level management within their district (Association of Drainage Authorities n.d.). They become involved in preparing a Strategic Flood Risk Assessment (SFRA), as well as applications for major developments in flood zones or applications affecting an IDB-controlled watercourse. Through Schedule 3 of the Flood and Water Management Act 2010, the IDBs will become a statutory consultee for drainage system applications.

Highway authorities: Local planning authorities should consult the relevant highway authorities when preparing a SFRA and in applications regarding highway drainage. Highway authorities comprise the Highways Agency for main roads (A roads) and the county council or unitary authority for local roads.

Marine Management Organisation: An NDPB established in 2009 that aims to contribute to sustainable development in the marine area. They are involved in FRM schemes in the marine area.

Canal & River Trust: The former British Waterways and now a charitable trust, which is consulted by the local planning authority and developers regarding developments in areas that are near canals, especially ones above natural ground level, due to risk from breach inundation.

Navigation authorities: There is a variety of local and regional navigation authorities for managing features, such as waterways, aqueducts, canals, rivers and ports.

[27] CSOs are a measure to prevent sewer flooding when the sewer system becomes inundated with rainwater. This leads to a release of sewage into rivers or the sea. If WaSCs are not attempting to keep the number of CSOs to a minimum, they may be contravening European regulations on treating waste and water quality. In fact, the European Court of Justice ruled that two UK CSOs contravened a European Directive on wastewater treatment (BBC News 2012).

[28] For instance, Northumbrian Water is conducting a sustainable sewerage study in partnership with local authorities and the EA to research sustainable drainage opportunities (Kennedy and Hyslop 2012).

Emergency services: Local planning authorities should consult emergency services when preparing local policy and about any applications that have implications for emergency planning.

Insurance companies: Insurance companies have an interest in FRM, as it reduces their costs for insurance payouts. They stress the need for investments in flood defences, sustainable drainage and a planning system that avoids development in areas at risk of flooding. They want insurance costs taken into account in decisions on development in flood risk areas. The government is dependent on the insurance industry to fund flood losses instead of introducing government compensation (Green and Penning-Rowsell 2004).

Community: The community has opportunities to be involved in policy formation and policy implementation. Indirectly, they can vote in national and local elections, whilst directly, they are consulted in local policies and planning applications. Prospective residents of proposed developments do not usually have any input, as they are unknown at that moment. Additionally, after the development has been completed, flood risks may not be that obvious to new occupiers and sometimes only become known when applying for insurance.

Perceptions of flood risk can differ greatly amongst people and are heavily influenced by both situational and cognitive factors. Flood risk awareness of an individual grows if they have direct experience with flooding or a great emotional response to flooding. Those without flooding experience may think that because their house was granted planning permission, it must be safe from flooding. In reality, the planner will have assessed the information available and considered that the benefits of development outweighed the risks of flooding in that area (White 2010). Moreover, actors communicate risk differently, which may be inferred in different ways by others. The public's perception can differ greatly from the scientists' perceptions who rely on knowledge (Bradford et al. 2012), creating a tension between the 'facts' and the 'feelings' of flood risk. Communication of objective versus subjective risks between scientists, planners and the public is therefore vital, which will allow individuals to make their own decisions about what level of flood risk they find acceptable (White 2010).

Furthermore, the community also includes riparian landowners, whose land or property adjoins a river or other watercourse, including a culvert. They have a legal duty to keep

the watercourse or any structures in the watercourse free from obstruction and pollution. Any works that impact on the watercourse need consent (Environment Agency 2012c). Other landowners may also have an interest in FRM, such as farmers.

CIRIA: This is a not-for-profit organisation that conducts research for the construction industry. It also deals with FRM and has developed guidance for the construction industry on flood resilience and SuDS, but also on incorporating FRM in the development control process.

Developers and applicants: Developers and applicants are required to assess flood risk in a proposed development, create a site-specific flood risk assessment (FRA) if required and fund flood protection measures. Their interest is to develop and in most cases to make a profit.

National Flood Forum: Charity established in 2002 with start-up funding from the EA. They help people to prepare for and recover from flooding, but they also campaign on behalf of flood risk communities and work with government and agencies on the national and local level.

3.3.5 The wider context

The actors that operate in the field of FRM and planning form governance networks to develop or implement policy. These governance networks are situated in a wider context, in which structures, but also other networks and actors, influence decision making. These structures differ from network to network, but some common structures can be identified, which take place mostly on a global and national level. These structures in the wider context will influence the governance network, although this influence is context and time dependent. The structures are visualised in Figure 10[29] and are further discussed below.

Formal institutions: These are the key regulations and policies that are relevant to FRM and planning, which are explained in more detail in Appendix A. Formal regulations can form barriers to actors, such as before 2010 when no authority had powers to take overall responsibility for the management of surface water flooding. In other cases, regulations may present opportunities or resources that can be used to exert power; for

[29] There are no relationships shown between the structures and actors in this figure, as it is only intended to illustrate these elements and not how they interrelate; this is shown in the theoretical framework.

instance, the Flooding Direction, which provided the EA with more power to influence decision making.

Government and policy change: A change in central government can bring about a change in policies. For example, the UK coalition government has made changes to the planning system in England, which affects decision making in the planning process. Moreover, as the SoS can decide on referred planning applications, a change of SoS can cause a change in decision making.

Climate change: The occurrence of climate change affects FRM; for instance, future flood risk is calculated by taking sea level rises and increases in rainfall into account (DCLG 2012b). Heavy rainfall events in 2012, together with above average rainfall, have heightened awareness of climate change and the impacts it can have. Therefore, climate change can change the perception of actors on the importance of addressing flood risk.

Flood events: Flood events in the past have created urgency in addressing the problem of flooding and as a result have brought about policy change. Flood events also increase knowledge on flood risk and awareness amongst actors. Moreover, personal flood experience changes an actor's perception of flood risk, whilst a local authority with recent flood experience may prioritise FRM more than those that do not have this experience (Richards 2005).

Economic situation: The economic situation in a country can affect its policies; for instance, the recession in England has caused the coalition government to place much emphasis on the planning system encouraging development.

Governance: Through the governance system, governance networks have formed that take decisions on how to manage flood risks. This governance system is a Type II multi-level governance with a neo-liberal perspective. Actors involved are a mix of public, semi-public and private actors, but responsibility, accountability and authority are fragmented. Moreover, decisions on FRM are taken on various spatial levels. Any decisions taken on a national level heavily influences implementation on a local level, whilst decisions taken in one local area can affect neighbouring districts.

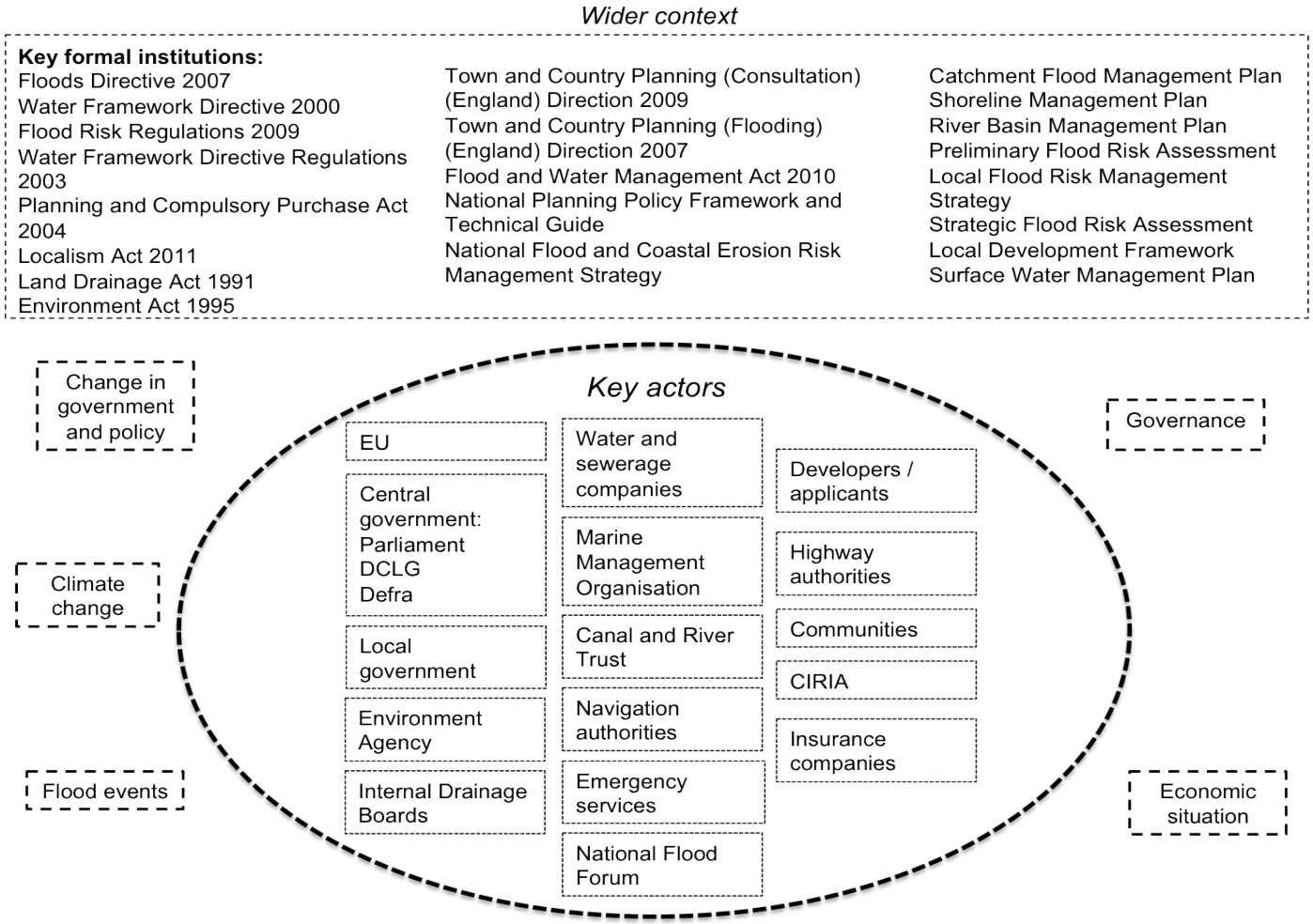

Figure 8: Key actors and structures in flood risk management in England

3.3.6 The outcome of flood risk management

The outcome of the governance network is the way flood risk is managed. The aim of FRM is to manage current and future flood risks. As flood risk is related to climate change, FRM has also become part of climate change adaptation. Adaptation is aimed at adjusting natural or human systems in response to the effects of climate change (IPCC 2007a). In the case of FRM, adaptation is often anticipatory and the result of a deliberate policy decision.

FRM can entail structural measures, non-structural measures or a combination of both. Spatial planning is a non-structural measure by considering flood risks of development inside and outside flood zones. If a planned development has flood risk issues and structural measures are needed to protect a development, planning ensures the development is safe and does not raise flood risk anywhere else. For instance, planning can influence the design and layout of a development and the buildings within it. The degree to which buildings are flood proof can be improved, space can be created for a river or the sea to flood without causing damage and SuDS can be incorporated to decrease the risks of surface water and sewer flooding (Evans et al. 2008, Neuvel and van der Knaap 2010). FRM can therefore be incorporated into a development and may even enhance it. However, at times, water, land and people may be mutually exclusive and conflicts may emerge between FRM and development. Finally, FRM in the short term may create problems in the long term, for instance through the escalator effect.

3.4 Conclusion

This chapter examined the development of network governance in FRM and the planning system. In the past, rural and urban areas were protected against flooding by building structural measures. In recent decades, this narrow view concerning the reduction of the probability of flooding broadened into a FRM that uses an integrated approach. This development is the result of changing views on controlling the environment and an increasing understanding of the effects of climate change. There is awareness that floods cannot be wholly prevented, and instead, structural and non-structural methods are applied to managing the probability and the consequences of flooding. Planning contributes to modern FRM by influencing the location and design of developments.

Governance networks play an important role in developing and implementing FRM. This chapter has identified some of the actors present in these networks. Central government has shifted responsibilities for managing flood risk towards other agencies, local authorities, and communities and individuals. As a result, there is a plurality of authorities involved in FRM. These authorities, from the public, semi-public and private sectors, have different responsibilities for managing flood risk and cover various spatial levels. Therefore, the governance system of FRM is a Type II governance with neo-liberal or free market influences. Policy development and implementation take place in local networks, whilst central government keeps control through a strategic line created by national policy and regulations.

Inside the governance network, the actors will try to influence FRM outcomes, but diverging problem definitions, solutions and risk perceptions can complicate decision making. Furthermore, flood risk is an uncertain, difficult and technical problem and knowledge can be used to exert power. However, governance networks have the opportunity to produce unique outcomes that can address the problem of flood risk by combining the resources and problem-solving skills of actors. This would result in unique, high-quality developments in which FRM has become an integral part and which make them desirable places to live and work.

The agents are also influenced by wider structures. An influential structure is the occurrence of flood events, which can create urgency amongst actors to produce FRM. On the other hand, a neo-liberal governmentality and the drive to overcome an economic recession can cause development to be prioritised over flood risk. In practice, even though the number of planning applications approved against the EA's advice has fallen over time, development still takes place in areas at significant risk of flooding, particularly in regions with high development pressure.

Chapter 4 Research design and methods

4.1 Introduction

This chapter presents the methods that were used to design this research and collect and analyse the data. Section 4.2 outlines the ontological and epistemological foundation of this research. This is followed by section 4.3, which explains the case study approach and why this has been used for this research. It also includes a description of the methods and tools used for case selection, data collection and analysis. Furthermore, section 4.4 covers the ethical considerations of this research. Lastly, section 4.5 discusses the issue of reflexivity.

4.2 Theoretical foundation

Research can be based on a foundational or an anti-foundational ontology. These ontologies lead to particular epistemologies; for instance, positivism is based on a foundational ontology, whilst interpretivism is based on an anti-foundational ontology. However, there is a third option that adopts a stratified ontology, which is critical realism (Bhaskar 1975, Sayer 2000). Critical realism distinguishes between the real, the actual and the empirical (see Figure 9). The real domain is composed of natural and social phenomena that exist independently from humans. The actual domain is formed by the events that are caused by mechanisms from the real domain, when certain triggers cause the event to occur. The empirical is the domain of experience; it is the observing of events by humans. An example to explain these three domains is the greenhouse effect. The real domain is the universe, including the earth, the sun and the mechanism that causes gases trapped in the atmosphere to heat up the earth. These phenomena have always existed, even when people were unaware of this. However, the increased production of these gases by human society has triggered the heating up of the earth. When people observed this change, the event became part of the empirical domain. People formulated the problem of climate change, which exists in the empirical domain. They gathered knowledge and formulated theories, again in the empirical domain, in an attempt to understand the real and actual domain. As a result, policy solutions were developed in an attempt to produce desired events.

The real domain is not only composed of natural structures, but it also includes social structures. However, there is a difference between the two. Whereas natural structures exist independently from humans, social structures have a closer relationship with agency (Mingers 2004). Social structure is the result of human agency and agents are able to reproduce or transform social structure. At the same time, social structure influences agency by enabling or restricting behaviour. Social structure exists whether a particular person is aware of it or not, but when a person acts it may affect the underlying structure. The agent can reproduce or transform a social structure on purpose or whilst being unaware, triggering expected or unexpected events. Therefore, to a certain extent social structures are seen as being independent.

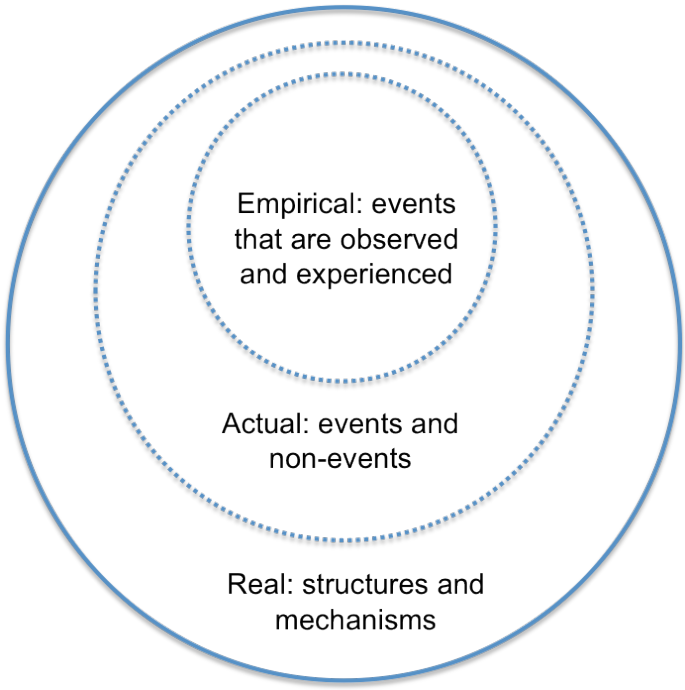

Figure 9: Critical realism's stratified ontology
Source: Adapted from Mingers 2004: 92

The type of ontology and epistemology used affects the research that is conducted, including research into policy processes. Policy processes and decision making take place in an open social world, with many different independent variables, which means that policy outcomes depend on specific contexts (Sayer 2000). Therefore, researching policy processes is complicated, because many independent variables influence the process and the outcome, which makes the identification of causal relationships between process and outcome problematic. However, if a policy researcher applies positivism to their research, complications may arise, as their empirical observation does not account for the open social world as critical realism does. In addition, it

produces causal relationships without asking 'why'. Moreover, policy research often applies case studies with a limited number of cases, which is unacceptable within positivism (Easton 2010). Critical realism, on the other hand, enables the use of a limited number of cases and makes generalisation possible (Danermark et al. 2002). It also allows for a deep investigation of structures behind causal relationships to answer the 'why' question.

In addition, applying interpretive approaches can create problems with evaluation and comparison with other research (Easton 2010). Critical realism agrees with interpretivism that social phenomena are concept dependent, but differs in that it acknowledges reality and causal explanation, solving interpretative problems with evaluation and comparison. However, an issue with critical realism is that in a case study with a complex context it may be impossible to identify all causal relationships. In addition, 'what causes something to happen has nothing to do with the number of times we have observed it happening' (Sayer 2000: 14), and research outcomes from a case remain difficult to generalise.

The theoretical framework used in this research is for an important part based on Marsh and Smith's critical realist model (2000) that explains decision making by examining the dialectical relationships between structure and agency. In critical realism, human behaviour is influenced by structures and agency. However, critical realism is a philosophical position, which does not prescribe universal research designs (Yeung 1997). Therefore, the research design depends on the type of research conducted. The next section discusses how the research design for this research has been chosen.

4.3 The case study approach

This research uses the case study approach to examine governance networks. The case study is a widely applied and accepted research design, which has been used in academic research for many years, but has experienced waves of popularity. In the United States, the Chicago School studied neighbourhoods at the Department of Sociology, University of Chicago from 1916 onwards and became a leader in the case study approach. Its research focused on problems provoked by urbanisation and immigration, using open interviews, observation and document analysis. This approach received much criticism, for instance concerning the validation of theory and generalisation. At the beginning of the 1940s, due to this criticism and a preference for

quantitative methods, case studies were used less frequently. However, in the 1960s, there was a renewed interest in case studies after scholars experienced problems with the confinement of quantitative methods (Hamel et al. 1993). Since then, the case study has remained a popular approach in the social sciences and has been widely applied in, for instance, sociology, anthropology, public administration and psychology (Noor 2008, Iwakabe and Gazzola 2009).

A case study examines a contemporary and real-life event in detail, using empirical data (Yin 2009: 18). A limited number of cases is examined, but a plurality of variables is used to collect data (Somekh and Lewin 2005). The research aim and questions determine whether a case study is suitable for particular research, for instance, if questions focus on 'how' and 'why' (Yin 2009). Two main research questions of this research focus on 'how', whilst the third is a 'what' question that is answered by analysing the findings derived from the first two questions. In addition, the research aims to explore the nature of network governance in local planning processes, requiring the examination of a real-life event in detail. Therefore, the case study is the most suitable research method that enables an in-depth investigation of governance networks.

The cases used are governance networks that include a group of agents taking decisions on FRM. These networks exist independently from this research. In addition, as the decision-making process has taken place outside the research, its boundaries are predefined. Following the typology of cases by Ragin and Becker (1992), this research treats the cases as an empirical unit. However, as it also examines the structures that have affected decision making, there is no clear boundary to which structures and events may be relevant. On the one hand, it is vital that all influential structures have been included to identify dialectical relationships. On the other hand, the case should not be too broad in space and time, as this will produce an overload of data, making it near impossible to find relationships. There will also be a risk that it will result in long and complicated chapters, making key issues to be studied to become lost in the excess of text (Stake 1978, Eisenhardt 1989, Remenyi et al. 2002, Yin 2009). This balance between a case becoming too narrow or too broad and the inclusion of important structures was assessed during analysis, referring continually to the theoretical framework and the data collected.

The case study is an empirical inquiry, which is based on quantitative methods, qualitative methods or a combination of both. In this research, two qualitative data

collection tools were used, namely interviews and document analysis. These are commonly used methods, because they create triangulation (Mangen 1999), benefiting the reliability and validity of the research and the robustness of the case study (Eisenhardt 1989). In addition, observation through site visits was used. These data collection tools are explained in more detail in section 4.3.2.

In this research, two cases were examined. A multiple case study is more robust than a single case study, because there is comparable data. A disadvantage is that it requires time, effort and resources (Knight and Ruddock 2009, Yin 2009). To ensure greater depth of analysis, but taking into account resource availability, the number of cases was limited to two. Furthermore, in a multiple case study, replicating a design is important. Cases should be selected using the prediction that results are either expected to be similar or contrasting (Eisenhardt 1989, Yin 2009). In this research, the cases were chosen to be different (see section 4.3.1). The aim is not to conduct comparative research, because the number of cases is small and cases are selected based on known outcomes, as opposed to random selection, which would lead to false findings (Dion 1998, Bennett and Elman 2006).

Another important consideration is generalisation. Case studies are generalisable to theoretical propositions, but not to populations or universes (Yin 2009). In addition, the limitations of the research need to be taken into account. For instance, studying a small number of cases forms a limitation, thereby restricting generalisation. Flyvbjerg (2006) argues that generalisation from a single case is possible; however, if multiple cases are included, replication logic is produced and generalisation becomes more reliable. This research used the results of the case studies for analytical generalisation, whilst taking limitations into account.[30] For example, generalisation will focus on contributing to governance network theory and to knowledge on examples of decision making on FRM. Key factors influencing FRM can be identified from the two cases, but that does not mean they will occur again in another case, or that the outcome of future cases can be predicted. Structures and agents are dependent on the temporal and spatial context and every case is therefore unique. Therefore, no predictions are made concerning the outcomes of other networks in FRM.

Finally, applying a case study produces various benefits. It provides a detailed analysis of specific, contemporary phenomena, producing insights that other research approaches

[30] A discussion of the limitations of this research can be found in section 8.4.

cannot provide. At the same time, through analytical generalisation, this type of research can contribute to academic knowledge and the formation of theories. Case studies can also be applied to many purposes, providing flexibility for the researcher and a great variety in academic research (Gomm et al. 2000). However, to ensure the research is reliable, the processes of case selection and data collection need to be explained and methodically applied in research. This is the focus of sections 4.3.1 and 4.3.2.

4.3.1 Case selection method and tools

The research questions focus on governance networks in FRM within local planning processes in England. The choice was made to study development management processes, as opposed to local policy processes, as this enabled the investigation of the delivery of FRM in practice. In the local planning process, development management is the last step that influences the outcome of FRM, resulting in implementation, which affects the environment. It is the action people take from the empirical dimension, based on their understanding of structures and mechanisms, to prevent undesired events and create desired ones. Therefore, the development management process is a crucial process, in which important decisions are made that directly influence the way flood risk is managed in England.

In order to study governance networks and the outcome of FRM, two planning applications were studied, in which a network of actors were interacting on a particular flood risk issue. There were several selection criteria to find and choose suitable cases. Firstly, the development had to be a housing development or mixed development that included housing. This criterion was chosen because flooding of residential dwellings usually causes the greatest impacts and controversy. Therefore, it was more likely that flood risk was an important issue in the governance network. Secondly, the development had to be major,[31] because larger applications are more complicated, resulting in the involvement of multiple actors and providing the opportunity to analyse network interaction. It is also more likely that there is a larger flood risk issue in major developments. Thirdly, as one of the dialectical relationships includes the outcome, a planning decision had to have already been made. Fourthly, in order for actors to be able to recall the decision-making process, the network had to either still be active or

[31] Containing a minimum of ten residential dwellings.

had to have been dissolved in the recent past (five years). Fifthly, two cases were selected using the prediction that results will be contrasting, based on whether interaction was based on conflict or cooperation. Choosing contrasting cases enabled the study of differences in key factors, in order to form a conclusion on which factors may be the most crucial.

To search for cases, a combination of methods was applied. An established method for finding cases was unknown to the researcher; therefore, a pilot search was conducted that was limited to the North-East of England. The reason for choosing this region was because the researcher was based there and it was easier to locate and communicate with people who were able to help with the search. For instance, one researcher at Newcastle University had in the past worked as a planning manager at the Association of North East Councils and was able to suggest potential cases. In addition, a meeting took place with a planning technical specialist from the local EA office. Furthermore, a regional list with planning application objections from the EA from 2007 to the beginning of 2011 was used. Lastly, an internet search was conducted, using various resources including the Planning Magazine casebook. After this initial search, two cases were found. One, which surfaced multiple times during the search, was Newcastle Great Park (NGP), but the other one was considered unsuitable as the application was withdrawn and no outcome was reached.

After this, the search was broadened to the rest of England. The same employee from the EA was approached, who sent a request for help with cases to other EA offices, which resulted in further email contact with employees in various regions. Other key people from the EA and local authorities with flood risk issues were also identified through an internet search and contacted. In addition, to reach more people, a message was placed on the National Flood Risk and Water Management Community online group, which has members that work in the FRM field (Local Government Association 2013). Again, the list of objections from the EA was used. As the dataset was large, this time the results were filtered to include only applications that were objected to on loss of flood storage, exception test not passed, or risk to the development. This way, the applications with the most pressing flood issues were selected and those that were objected to on the grounds of insufficient information or unsatisfactory FRAs were filtered out. However, where in the past the description of objections in England was included in High Level Target 5 reports, after 2008 this detailed information was replaced by summary reports. These new reports lacked information, including that on

the specific applications approved against the EA's advice. This meant that finding suitable applications became more difficult.

Figure 10: Map showing the location of the cases

Source: Find 2013

Due to the economic recession causing a slump in development and an increase in the number of withdrawn applications, the number of suitable cases found was lower than expected, but sufficient. A shortlist was devised with nine cases, which included the following characteristics for each: development type, the year the application was submitted, the type of interaction between actors, whether the EA approved the application, whether the application complied with FRM policy, the type of network, the type of flood issue and the current planning stage (this list is included in Appendix D). The selection criteria that were of greatest importance were the network size and actor interactions (conflict or cooperation) and the two cases deemed best for this research were selected in a discussion between the researcher and the supervisors.

As a result, the cases that were chosen were Newcastle Great Park (NGP) in the North-East of England and the cricket ground redevelopment in Chelmsford in the South-East of England (see Figure 10). NGP is a large mixed development in the north of Newcastle upon Tyne. The development is on former green belt land and has issues with fluvial and pluvial flooding. The actors in the network are cooperative and the network is still active in the development's implementation phase. The cricket club ground in the centre of Chelmsford is a redevelopment including new cricket facilities and residential dwellings. There is a significant fluvial flood risk on part of the site, where the residential development is planned. The actors in the network were in conflict; the network was partly dissolved in 2009 after planning permission was granted and the development is now in its implementation phase.

4.3.2 Data collection method and tools

In a multiple case study, replicating a design is important (Eisenhardt 1989, Yin 2009). Therefore, for each case the same data collection method and tools have been applied. The data collection design has been based on past and current research on network governance, which has made extensive use of qualitative methods. This is also a suitable method for a case study approach. Data collection tools are, for instance, the analysis of reports and minutes from meetings between actors in a network. However, even though these provide much information, they lack the perspective of the actors and other informal aspects. Therefore, it is important to conduct interviews as well (Bogason and Zølner 2007). For this research, a combination of document analysis and semi-structured interviews was applied. Site visits to the development sites also took place. Table 3 relates the research questions, the chapter in which they are addressed and the data collection tools that were used.

Document analysis served several purposes. Firstly, it provided a first insight into the policy problem, the actors involved, their perceptions, interactions and the outcomes of the process. This document analysis also guided the contents of the interviews, which were used to gather information lacking from the documents, to clear certain issues up, or to identify any other actors that may have been involved in the process. On the basis of these interviews, new documents were analysed or old documents reread in the light of new information.

For the case of NGP, planning applications relating to it, the accompanying original and revised master plan, and any other plans relating to the development were studied. Additionally, policy documents relating to spatial planning from Newcastle and the region were collected, such as regional spatial plans, the local Unitary Development Plan (UDP) and the emerging LDF, as well as any flood risk-related policy documents from the region and the local authority. Other reports and research on flood risk and FRM, reports from the residents' association and newspaper articles were also collected. Lastly, minutes and reports from various committees and subcommittees from the local authority that discussed the NGP development were gathered from the years 1997 until 2012. Documents were collected online, from Newcastle City Library, Newcastle City Council planning department, Tyne and Wear Archives and from participants. A list of all documents collected is included in Appendix E.

Research question	**Chapter**	**Data collection tool**
1) How has network governance of FRM developed?	3: Network governance of flood risk management	Literature review
2) How do governance networks in FRM function?	5: Newcastle Great Park 6: Chelmsford cricket ground development 7: Network governance in local planning processes	Document analysis Interviews Site visits
3) What are the key factors in network governance that influence FRM?	7: Network governance in local planning processes	None (analysis)

Table 3: Research questions related to chapters and data collection tools

For the cricket ground redevelopment in Chelmsford, policies, plans and reports were collected that formed the background to the case, such as local and regional spatial plans and flood risk documents. Additionally, documents forming part of the planning application, public inquiry documents and the inspector's report were collected. Lastly, local news articles were gathered. Documents were gathered online, were downloaded

from the PublicAccess system on Chelmsford City Council's website or were provided by participants. All documents that were collected are included in Appendix F.

In addition, interviews were carried out. The aim of interviewing was to find key actors who were involved in the planning process and FRM and to gain understanding of the decision-making process from the perspective of the participant. Firstly, an interview guide was developed, which was based on the theoretical framework. The questions that were derived from the theoretical framework are included in Appendix I. The interview guide also addressed any particular issues that had been identified from document analysis (see Appendices K and L).

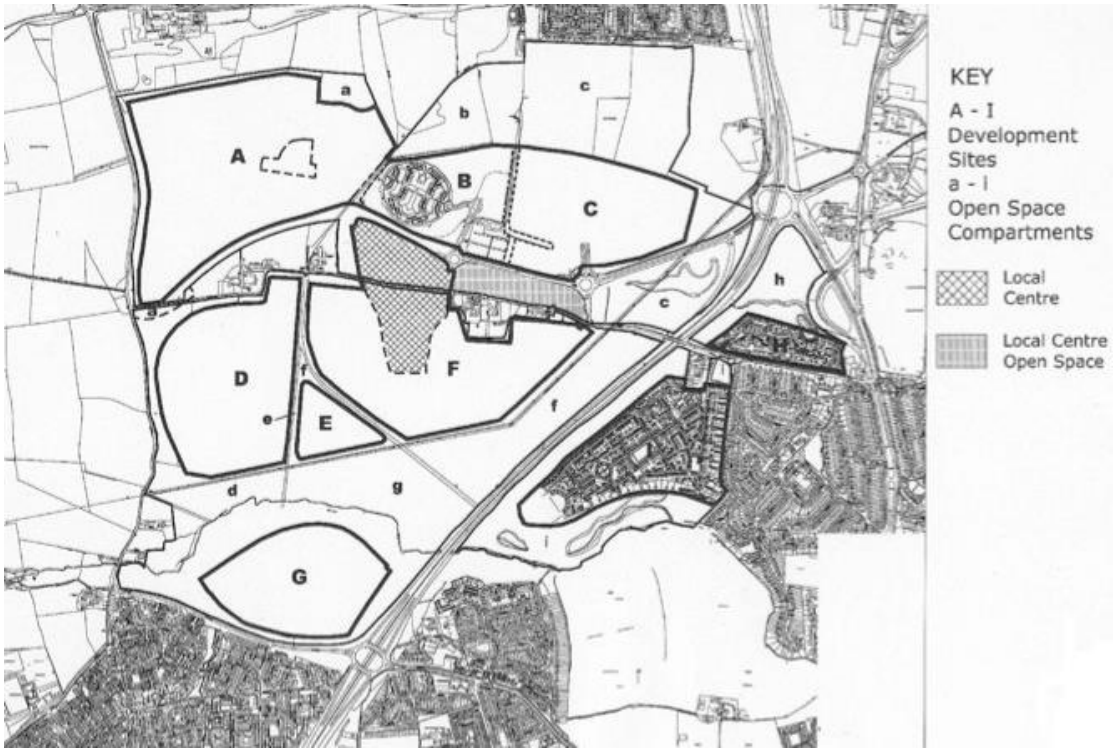

Figure 11: Newcastle Great Park development cells
Source: Adapted from Newcastle City Council 2007: 13

Secondly, the key actors to interview were identified by using the gathered documents and the method of snowballing: asking every participant if they could recommend another actor to be interviewed. The people involved were categorised and the aim was to be able to speak to at least one actor in each category. For NGP, the categories were the local planning department, the EA, the development companies, the WaSC, the airport, councillors and residents. In addition, to increase understanding of the controversy of development in green belt land, an interview was conducted with a member of the Green Party. Lastly, to gain understanding of the early stages of decision

making, two actors were interviewed that were part of this process. Even though this took place more than five years ago, the actors were still able to recall many details of the decision-making process. The majority of the interviews, however, were about the current process, which therefore met the case selection criteria.

Figure 12: Drawing of the planned cricket ground development.
Copyright: MCD
Source: ECCC and MCD 2008

For the Chelmsford cricket ground case, the categories of actors were the local planning department, the EA, the cricket club, the development company, the flood risk consultancy, the planning consultancy, councillors and residents. The aim was to interview similar categories in both cases, which was mostly achieved. However, in Chelmsford, the WaSC did not play a role, whilst the Green Party did not wish to be interviewed. The Green Party was not directly involved in the process, but was contacted to increase understanding of sustainability issues with development. In addition, in the Chelmsford case consultants played a more important role than in NGP, which is why they were included.

Participants were contacted by email, by explaining the purpose of the research and the reason for approaching them. They were asked to reply if they agreed in principle. If no reply was given within two weeks, a reminder email was sent. If a reply was given, they were contacted again to arrange a date for the interview and to provide the interview questions.

Number	*Organisation*	*Function*	*Referenced in text*
1	Newcastle City Council	Planning Officer	Planning Officer A
2	Newcastle City Council	Planning Officer	Planning Officer B
3	Newcastle City Council	Engineer	Council Engineer
4	Newcastle City Council	Councillor	Councillor A
5	Newcastle City Council	Councillor	Councillor B
6	Newcastle City Council	Councillor	Councillor C
7	Environment Agency	Flood Risk Officer	EA Officer A
8	Environment Agency	Flood Risk Officer	EA Officer B
9	Consortium of Developers	Project Leader	Developer A
10	Water and Sewerage Company	Manager	WaSC Officer
11	Local Residents' Association	Chair	LRA Chair
12	Newcastle Airport	Planning Officer	Airport Officer
13	Newcastle Green Party	Party representative	Green Party Representative

Table 4: Case study interviews conducted for Newcastle Great Park

In total, 41 people were contacted to request an interview.[32] Of these, 16 people were unavailable for an interview for a variety of reasons. For the NGP case, four planning officers approached did not work for the council any more and were untraceable or did not have knowledge of the decision-making process, one employee of the consortium did not respond and one did not agree to an interview, one councillor was no longer working as a councillor, and one coordinator for the development and one flood risk expert did not respond. For the Chelmsford cricket ground case, four councillors did not have knowledge of the decision-making process or did not respond, one Green Party representative did not respond, one EA officer was on maternity leave and one resident was unable to attend the appointment made.

[32] Twenty-two people in the Newcastle Great Park case and 19 people in the Chelmsford cricket ground case.

Number	*Organisation*	*Function*	*Referenced in text*
14	Chelmsford City Council	Planning Officer	Planning Officer C
15	Chelmsford City Council	Planning Officer	Planning Officer D
16	Chelmsford City Council	Councillor	Councillor D
17	Environment Agency	Flood Risk Officer	EA Officer C
18	Environment Agency	Flood Risk Officer	EA Officer D
19	Environment Agency	Flood Risk Officer	EA Officer E
20	Cricket Club	Senior Manager	Cricket Club Manager
21	Development Company	Project Leader	Developer B
22	Flood Risk Consultancy	Flood Risk Consultant	Consultant A
23	Planning Consultancy	Planning Consultant	Consultant B
24	Local Residents' Group	Member	LRG A
25	Local Residents' Group	Member	LRG B

Table 5: Interviews conducted for cricket ground development

In total, 25 interviews were conducted (see Tables 4 and 5 and Appendix G for more detail). The key participants interviewed all represented a group of actors in the decision-making process. Therefore, even though 16 people were unavailable for an interview, every actor group was represented by at least one participant, and thereby the interviews provided an overview of all interests in the process. Most interviews were conducted face to face, but in some cases due to location issues, the interview was conducted by phone. In one case, due to time restrictions posed by the participant, the interview was conducted by email. Face-to-face interviews lasted approximately an hour or longer, with phone interviews being between half an hour and over an hour long. Interviews were voice recorded and transcribed. However, meetings in public places restricted recordings. Due to noise levels, in one interview the choice was made not to record, whilst two others were recorded, but were of low quality, which was expected to be the case. In these three interviews, very detailed notes were taken on purpose and the interview was typed out the same day.

The interviews were semi-structured: the main questions and script were fixed, but the interviewer was able to improvise follow-up questions and to explore meanings and areas of interest that emerged. The interview questions were based on the theoretical framework. During the interview, the researcher referred to an interview guide with an introduction, the questions and a conclusion. The interview guide for NGP is included in Appendix K and that for Chelmsford's cricket ground development in Appendix L.

Lastly, site visits were conducted to NGP and Chelmsford's cricket ground. The purpose of these visits was to gain understanding of the development, the flood risk, the flood risk sources and the potential flood consequences. In addition, the visits were used to gather photographs to include in the thesis. NGP had already been partially built on, with some areas under development and other areas still undeveloped. Three site visits were conducted, in February and July 2012 and in June 2013. The areas visited on both occasions were the developed areas of Cells H and I, including the SuDS and the Ouseburn in Cell I (the SuDS pond in Cell H cannot be reached by the public). Also visited were Cell C, including the SuDS and the Letch; and Cell G, which is partly developed, including the SuDS in Cell G and the Ouseburn. In addition, Cells D, E and F, which are under development, were visited (for a map of the cells see Figure 11 on page 98). Chelmsford cricket ground was visited in May 2012, but the development was not yet under way. The visit included the cricket grounds, the public car park that is part of the development, the river Can, the river Chelmer and the park opposite the development. On all site visits digital photographs were taken, which have been included in the case study chapters (Chapters 5 and 6) and Appendices M and N. Overall, the data collected has been sufficient for analysis and for developing useful conclusions and contributions.

4.3.3 Data analysis method and tools

Once data from the documents, interviews and site visits had been gathered, analysis was undertaken in order to answer the research questions. The foundation of this analysis was the theoretical framework and the questions that were derived from the theoretical framework in Appendix I. All documents and transcriptions of interviews were read carefully several times. Notes were taken continually to highlight certain themes or queries.

In addition, NVivo was used for part of the data. For the NGP case, the total of collected minutes and reports from committees over 15 years was numerous (over 400 documents). Therefore, to efficiently filter relevant information on FRM, all these documents were uploaded into NVivo. In NVivo, documents were read through and coded. The nodes created are shown in Appendix H. Coding served two purposes: to collate information based on certain key words, and to catalogue actors present in the meetings. By selecting a certain node, for instance Cell G, all sources and references in which Cell G was mentioned were shown. In addition, a list was generated of each actor involved. As a result, the most relevant information was filtered and key actors were identified.

The information from all the data was used to identify important events and to write the case chapters, in which a story is told chronologically about the development and the way flood risk is managed. In addition, the theoretical framework was constantly referred to in order to identify important themes and key factors that influenced FRM, which are included in the analysis chapter (Chapter 7). This was an iterative process, which required constant reference back to data from documents, interviews and the theoretical framework. Lastly, conclusions were drawn between the research findings and the governance debate, which are also included in Chapter 7.

4.4 Ethical considerations

Ethical issues are important considerations in any research. In the early stages of this research and as part of the project approval process, preliminary ethical approval by Newcastle University was gained. Full ethical approval was unnecessary as this research did not involve any vulnerable groups, participants were aware they were partaking in research and no sensitive topics were discussed. Moreover, six key principles of ethical research as developed by the Economic and Social Research Council were applied:

1. Research should be designed and undertaken to ensure integrity, quality and transparency;
2. Participants must be informed about the purpose of the research, what their participation entails and how their information is used;
3. Confidentiality and anonymity of participants and information must be explained and respected;

4. Participants must take part voluntarily and they must be able to withdraw from the research at any time;
5. Harm to participants and the researcher must be avoided;
6. The independence of research must be clear (Economic and Social Research Council 2012).

In response to the six key principles, firstly, this research has been designed aiming for the highest quality in designing the research questions, data collection and analysis and in writing the thesis. In addition, the supervisors have been involved in every step of the process, thereby creating transparency. Lastly, this research has been developed out of interest in FRM and planning; there are no other motives for this research and therefore integrity is ensured.

Secondly, participants were informed from the first contact about the purpose of the research, what their participation would entail (an interview) and how the information would be used. In addition, informed consent was gained by providing the participants with an informed consent form. The consent form (see Appendix J) was based on the guide provided by Newcastle University's Research and Enterprise Service (Newcastle University 2012). In face-to-face interviews, these forms were given in person and participants were given time to read them before signing. For phone interviews, consent forms were emailed in advance. Consent was provided by them agreeing by email to the statements in the form, typing their name in the form and returning it by email.

Thirdly, measures taken to ensure confidentiality and anonymity were explained to the participants in advance and in the consent form, which were respected at all times. No names of participants are included in the thesis, only job descriptions. Recordings and transcriptions were anonymised by excluding names, and access to data was password protected. However, a limitation to this was that participants were involved in a planning process and often the names of people involved are publicly available. Even though only general job descriptions and the names of organisations are given, there is a possibility that specific people may be traced. This is not only a limitation to anonymity, but possibly also to the openness of the participants. This is discussed further in the next section.

Fourthly, all participants took part voluntarily. Those who did not respond to initial emails requesting an interview were contacted on a further occasion, but if there was still no response it was then assumed that they did not want to take part. If people

refused to be interviewed, this was respected. Participants were aware they could withdraw from the research at any time as this was stated in the consent form.

Fifthly, there was no harm to participants. Harm to the researcher was prevented by conducting interviews in public places or places of work only and by informing another person of the time and place of interviews.

Lastly, this research is independent. It was funded by the School of Architecture, Planning and Landscape at Newcastle University, but there were no criteria set concerning the content or the results of the research. Participants were aware that the research was conducted independently and the researcher remained neutral throughout. This neutrality is further explained in the next section.

4.5 Reflexivity

In this research, the key influences on FRM are found by examining structures and agents involved in governance networks. The agents are present in the empirical dimension and they experience, interpret and work with structures and events from the actual and the real dimensions. The aim is to find out what structures and events are relevant and how the agents interpret and use these structures and events in the decision-making process. However, the researcher also exists in the empirical dimension and can only investigate all three dimensions through his/her own experiences and perceptions. The knowledge in this research (and all science in general) is produced in the transitive dimension (Bhaskar 1975); for example, theories attempt to explain phenomena that are intransitive to these theories. Social science is therefore a social product (Mingers 2004) and as a consequence, reflexivity is an important aspect. The term 'reflexivity' refers to the recognition that the researcher is unavoidably part of the phenomenon they study (Maxwell 1996). This means that the researcher is an active participant and (unintentionally) influences data collection and analysis, because of their own perceptions and relationships with the participants.

In this research, the relationship with the participants was professional and neutral. Even though a researcher can never be completely neutral (Rose 1997), in this case it means that the researcher did not adopt a position or communicate a position to the participants during the research (for instance, agreeing or disagreeing with a development being approved). A potential barrier is that the researcher did not know any participants beforehand, which may have reduced participation. The number of

people who were involved in the planning process was limited to begin with; therefore, any refusal resulted in one fewer interview. However, in total, a sufficient number of participants were interviewed, representing a wide range of interests and perceptions.

Furthermore, the researcher was an outside figure writing a publicly available thesis, which could have formed a barrier to participants providing information. Even though participants' names are excluded, they could potentially be derived from the information about the location of the development and the public availability of documents. There is therefore a chance that people may be traced, which may have impacted on the openness of key people. However, despite this disadvantage, the information gathered has produced useful results. Lastly, another potential barrier is that English is not the researcher's mother tongue, but the researcher is fluent in it; therefore, there are no expected implications.

Chapter 5 Newcastle Great Park

5.1 Introduction

This chapter is a chronological description of the decision-making process concerning FRM that has taken place for Newcastle Great Park (NGP). This chapter has been informed by documents collected,[33] interviews with participants and two site visits. The aim of this chapter is to describe the decision-making process; data analysis is part of Chapter 7.

NGP has been used as a case study in various academic publications. For instance, research focuses on the failure of regional planning in the North-East of England (Benneworth and Vigar 2007) and planners' capabilities of addressing local issues (Carmona 2003). Other research concerns urban sustainability (Bulkeley and Betsill 2003) and an assessment of sustainability based on energy, land and water use (SUME 2011). A study by De Roo (2007) examines how actors in the planning process perceive and work with fuzzy concepts such as sustainability. He includes the case of NGP by listing the actors involved and their perspectives on sustainability, and finds that actors share sustainability goals, which are, for instance, visible in the cooperation between the developers, the local planning authority and the EA on matters of drainage. Even though NGP has been included in past research, a detailed analysis of the governance network and decision making regarding FRM has not been examined; this will be the contribution of this research.

5.2 Context and development of Newcastle Great Park

NGP is a housing and business development in Newcastle upon Tyne. The development consists of 1,200 hectares, comprising 2,500 residential dwellings, 80 hectares of commercial development and 440 hectares of parkland. The concept of NGP started to become part of local planning policy in the 1980s and implementation is ongoing. The following paragraphs will describe this development, starting with the designation of NGP in the emerging UDP and ending with the situation as of July 2012.

[33] For a complete list of collected documents, see Appendix E.

5.2.1 Designation of Newcastle Great Park in the emerging UDP

In the mid-1980s, Tyne and Wear County Council was abolished. The metropolitan authorities became unitary authorities, which were now solely responsible for planning in their local area. As a result, Newcastle City Council (NCC) became responsible for Newcastle upon Tyne, including the area of Newcastle Great Park.

At the time, planning officers at NCC were working on a prediction of population growth and housing need for the city. After they calculated these figures, they were unable to find sufficient development land within the existing built-up area of Newcastle that could accommodate the number of houses needed. Therefore, they turned to look for potential sites outside the city boundaries (Planning Officer B 2012, interview). Planning officers found support for this idea in the Strategic Planning Guidance for Tyne and Wear that was published in 1989. The guidance was developed to stimulate the revitalisation of the economy and to provide for housing. Newcastle and North Tyneside were expected to plan for 12,600 dwellings between 1988 and 2001, whilst considering the adequacy of land available and giving 'special attention to identifying attractive sites for both economic and housing development' (DoE 1989: 2).

Planning officers developed potential sites for development, which emerged formally in the UDP for Newcastle, of which the Consultation Draft was published in 1991. In this draft, two alternative development locations were included, which were both situated within the boundaries of designated green belt land. One of the areas was named the Northern Development Area, which was the same area that would later be called NGP. This development area was situated in the north-west of the city, near the A1 trunk road and Newcastle International Airport (Figure 13). Another area, the Western Development Area, was composed of two separate areas to the north and west of Westerhope in Newcastle (Newcastle City Council 2006).

When the plans for a new development in green belt land became publicly known, much opposition was shown from residents, interest groups and political groups. Consultation on the UDP showed that it was the most contested issue: 45% of people surveyed did not support the release of green belt land for housing, business and leisure purposes. Moreover, the vast majority of respondents showed 'total opposition to the proposal' (Newcastle City Council 1992: 5). Many of these were residents in adjacent areas, but also, the Department of the Environment (DoE) and other local authorities in the region

showed concern about the scale of development proposed and the lack of justification for it. In addition, the Newcastle Green Party felt that building in green belt land was unnecessary and there were enough development opportunities in other areas. The party also accused NCC of planning for unsustainable development by prioritising constant economic growth over environmental concerns, including hydrology (Green Party Representative 2012, interview).

Figure 13: Location of Newcastle Great Park in Newcastle
Source: Adapted from Knight Frank 2008: 4

In particular, the allocation of the Northern Development Area received a total of 975 comments, with concerns on the loss of green belt land and valuable flora and fauna. NCC's claim that the new development would have 600 hectares of green space was met with scepticism and it was felt this would not compensate for 'unspoilt rural landscape' (Newcastle City Council 1992: 16). It was also commented that the

development might negatively affect the Ouseburn and change the water flow into Jesmond Dene.

Some of the issues that followed from consultation were included in the UDP deposit stage, which was released in 1993 (Newcastle City Council 1993). In this new version, the Western Development Area was not brought forward, but the Northern Development Area was still included despite the controversy, albeit on a smaller scale. The council felt that the development was vital in improving the city's struggling economy, which had higher unemployment rates than any of the other local authorities in the region. Moreover, the development was expected to address the decline in population that was occurring at the time. In particular, economically active age groups, such as younger adults or families with young children, were moving to surrounding local areas, unable to find housing in Newcastle that suited their needs (Newcastle City Council 1998c). NCC found it was necessary to appoint an area for development outside the city boundaries that would enable the development of a large number of properties, but also because it would enhance the attractiveness of the development due to its more rural location.

Therefore, the aim of NGP was to 'create a coherent integrated development of the highest quality' (Newcastle City Council 1993: 192). As opposed to the regeneration areas within the city that required much public investment, NGP was built with private investment. The residential development was composed of high-quality buildings – primarily upper-market houses – in a low-density and attractive environment.[34] NGP was to solve a large proportion of housing need in Newcastle: of a total of 10,000 new houses planned in the UDP, 2,500 of those were in NGP. To prevent compromising housing demand within the city, properties were developed and released in different stages over several years (Newcastle City Council 1998c). In the meantime, whilst NCC had been considering the development, NedaCin Limited purchased and secured long-term options over land in NGP between 1989 and 1993 (Nathaniel Lichfield and Partners 1999).

One of the issues discussed in the UDP was flood risk. Firstly, there was awareness of drainage issues in the development area. It was local knowledge that the fields in NGP were prone to surface water flooding:

[34] Gross land for economic development was 139 ha and net 80 ha. Gross land for residential development was 172 ha and net 83.3 ha. The remainder was planned as parkland (Newcastle City Council 1993).

> There were many debates and there was much concern, because it was a well-known floodplain. Every winter you could see the fields full of water, so we all knew there was a problem that needed to be solved.
>
> (Councillor B 2012, interview)

In addition, the Ouseburn was a known source of fluvial flood risk. This river is a very reactive catchment, meaning that an isolated thunderstorm can quickly cause high water levels in the river, causing flash flooding (EA Officer A 2012, interview). This problem is caused partly by development from the past 50 years, such as Kingston Park, Red House Farm and Brunton Park (see Figure 14), placing the river under pressure from surface water runoff. As NGP was to become part of the Ouseburn catchment, surface water runoff had to be managed to prevent additional flows into the river and an increase in flood risk downstream.

Due to past flood events caused by the Ouseburn, flood risk was an important local issue. The council felt that if they allowed development, they would have to show how they were going to tackle surface water drainage in a way that would not exacerbate existing problems (Council Engineer 2012, interview). The planning officer involved in these early stages of planning in the 1980s and 1990s stated that:

> We were very conscious that there was a possibility for thousands of houses all draining into the Ouseburn. Whilst it did not have a huge drainage or flooding problem, we obviously did not want to make it any worse, so we talked to the National Rivers Authority. There was someone there who was really good and positive. As soon as we went to talk to them, he suggested to think about SuDS.
>
> (Planning Officer B 2012, interview)

Therefore, the planning officers and the NRA started discussions on how to manage surface water drainage. The NRA's policy at the time required surface water discharge at greenfield rate, but runoff was usually dealt with through underground pipes and tanks, with hydro brakes to restrict the rate of discharge. A development the size of NGP would require extensive infrastructure to achieve greenfield runoff rates. Coincidentally, the representative of the NRA had just started to gain knowledge of SuDS after attending a conference in Sweden on source control. The NRA officer found that the UK was lagging behind other European countries in applying SuDS and subsequently tried to promote the use of SuDS in the North-East of England. NGP was considered a suitable development to apply this concept, in particular because large areas of green, open space were planned, including along the Ouseburn. This open space

made the creation of ponds and wetland areas possible and, therefore, the NRA officer suggested developing sustainable drainage (EA Officer B 2012, interview, Planning Officer B 2012, interview). The planning officers adopted this idea and the proposal to use open storage areas was included in the UDP deposit stage, although no detailed plans were made at this point (Newcastle City Council 1993).

5.2.2 Public inquiry and adoption of the UDP

As required by legislation, a public inquiry on the UDP was held in 1994 and 1995. In the report written by the inquiry inspector (Hollox 1996) it was acknowledged that the proposal to build in green belt was the most contentious issue. There were many objectors, of which most were represented by the Newcastle Action Group to Save the Green Belt. The group was formed to campaign against the proposals after the first draft of the UDP was published. They created newsletters, raised a petition against the loss of green belt land, organised public meetings and submitted a formal objection. The main objections were that the proposed number of houses was unnecessarily high and that wildlife would be harmed. Instead, development should take place on other land in the region (Newcastle Action Group to Save the Green Belt 1993).

As part of the evidence presented to the public enquiry, prospective developers created a draft master plan for NGP. The council cooperated in developing the master plan and although planning officers indicated informally that the plan gave a good interpretation of policies and plans, there was no formal approval from the council. However, it was used by the inspector as an illustration of how the development might turn out. Based on all the evidence, the inspector decided to allow the development stating that:

> In my judgment, bearing in mind especially the high level of unemployment in Newcastle, the benefits to the City and region are of even greater consequence than the very serious harm which would be caused. I conclude therefore that the advantages of developing Green Belt land so outweigh the disadvantages that very special circumstances are demonstrated and they justify, in principle, the deletion of some land from the Green Belt for the stated purposes.
>
> (Hollox 1996: 103)

The inspector also considered that even though green belt land would be lost, mitigation measures were in place. The development would be based on the general principles of sustainability and the low density of the scheme in combination with the green, open space would benefit wildlife in the area. In addition, sustainable drainage systems

(SuDS) were planned near the two rivers on site, namely the Ouseburn and the Letch (a minor stream in the north of the site). Storage ponds with a capacity of 60,000 m^3 – the greenfield runoff rate – were proposed along the rivers to form an integral part of the development (*Draft master plan for the Northern Development Area*). The inspector found that the council and the NRA had been communicating well and he had no objections to the way flood risk was managed. He relied on the judgement of the NRA and was confident that the flood risk in the area had been identified sufficiently. Therefore, he felt that the objections that the development would increase flooding in the Ouseburn, and in particular in reference to Brunton Park, which had existing problems, had been taken into account and resolved sufficiently. He did not foresee any increased threat of flooding downstream, provided that appropriate measures were taken (Hollox 1996).

On 28 January 1998, the UDP was formally adopted. The new UDP had a general policy for flood risk, which NGP would have to comply with. This policy specified that development that would be at direct risk of flooding or that would increase the risk of flooding elsewhere would not be allowed. In the UDP, the areas with the highest flood risks were considered to be in the upper reaches of the Ouseburn, which excluded NGP. However, any new development could create more surface water runoff, adding to flood risk downstream. Therefore, developers had to mitigate flood risk and might be required to enter into planning obligations to pay for flood risk measures (Newcastle City Council 1998c).

5.2.3 Development of planning brief for Newcastle Great Park

The planning officers used the years between the public inquiry and the adoption of the UDP to develop ideas with the EA (which replaced the NRA) about using sustainable drainage in NGP. However, they found that it would not have been useful to go into too much detail, because the development had not been formally approved yet (Planning Officer B 2012, interview).

After the UDP was formally adopted and the development of NGP was approved, the council established a subcommittee to oversee the council's involvement in the planning and development of NGP (Northern Development Area Sub Committee 1998f). In addition, an officer working group was established in 1997 to develop a planning brief. The aim of this brief was to formulate the council's aspirations for NGP and to inform

prospective developers and create interest. During one of the working group's meetings, it was noted that the council was being urged by the EA to persuade developers to adopt environmentally sustainable forms of drainage and to include these measures in the planning brief (Northern Development Area Officer Working Group 1997b). In December 1997, during a seminar at the EA attended by developers, regulators, utility companies, councillors and officers from the council, the issue of sustainable drainage was further raised and NGP was discussed as a possible demonstration site (Northern Development Area Officer Working Group 1997a).

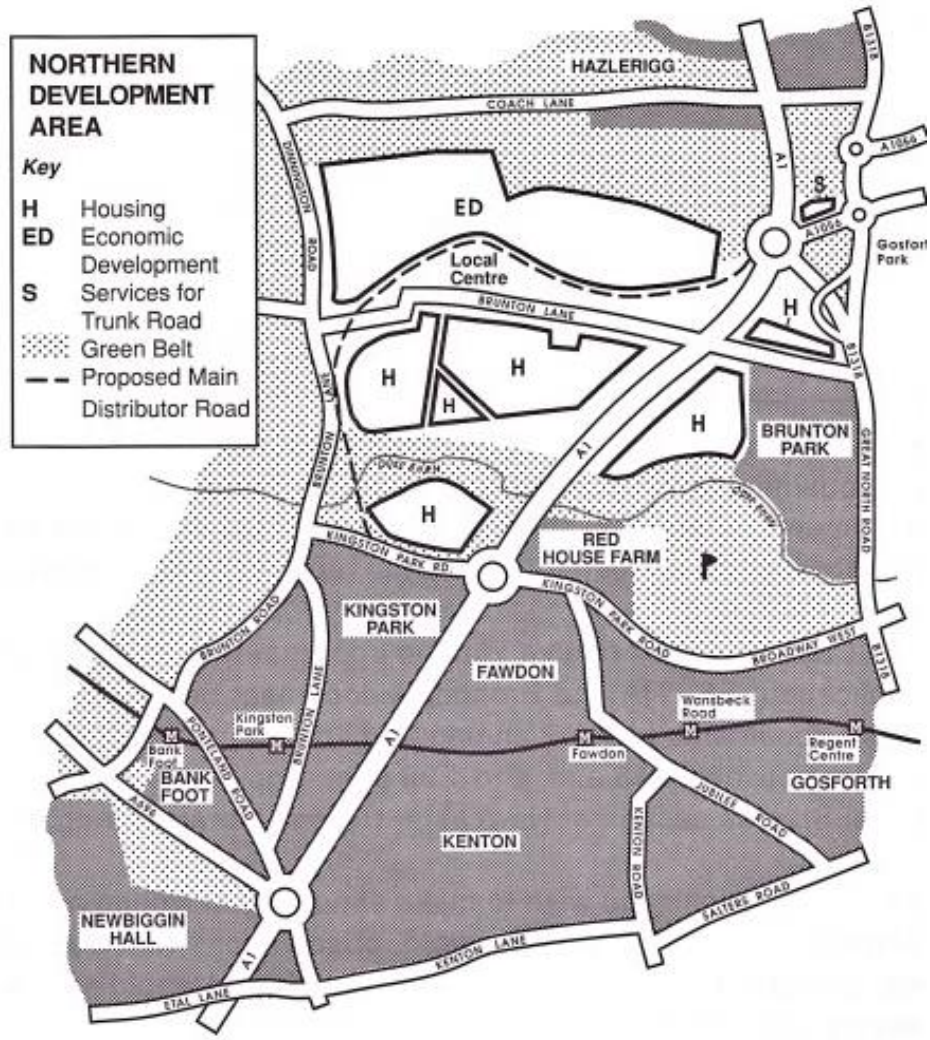

Figure 14: Plan of Newcastle Great Park within its wider environment
Source: Newcastle City Council 1998d: 1

The ideas developed on using sustainable drainage were taken forward into the draft planning brief, published in December 1997. In this draft it was stated that the potential developer had to ensure that the risk of flooding to properties would be at an acceptable

level and that the risk of flooding downstream of the development would be no higher than at present. The brief also stated that the creation of a large development on greenfield land would create the opportunity to implement sustainable drainage by providing storage within the Ouseburn floodplain, thereby lowering flood risk downstream (Northern Development Area Sub Committee 1998e).

In March 1998, the council held an informal meeting about the new development with residents in seven wards, in which issues with flood risk came up a number of times. In particular, residents in Brunton Park were concerned that NGP might exacerbate the incidences of flooding, which had caused residents damage and inconvenience during recent years. The prospective developers gave presentations as part of public meetings to address flood risk issues. Together with the EA, the developers informed residents that flood risk would not get worse downstream (Northern Development Area Officer Working Group 1998, Northern Development Area Sub Committee 1998e). The consortium of developers also gave a presentation to the subcommittee, claiming the development would be sustainable, taking into account environmental protection and LA21 considerations[35] (Northern Development Area Sub Committee 1998a).

Later that month, the EA and the water and sewerage company (WaSC) gave a presentation to the subcommittee, saying they had been discussing the proposed drainage system, but a number of issues remained, such as cost, maintenance and bird strike issues. The council fully supported the sustainable drainage approach. The importance of the development not increasing flood risk or possibly even reducing flood risk was stressed in the committee again (Northern Development Area Sub Committee 1998e). Therefore, all involved parties (council, developers, EA and WaSC) were supporting NGP to become a sustainable development, using sustainable drainage methods, even though some practical issues still needed to be resolved.

The planning brief that was released a month later included strategic aims for NGP and an invitation to prospective developers to submit draft proposals for inclusion in the forthcoming master plan. The aim for the development was not just to provide dwellings and employment, but also to offer an attractive setting and to promote best practice with regards to sustainable development techniques. Concerning FRM, the objective was to maintain the existing hydrology of the site and to promote the use of SuDS. The SuDS were not only to be used to address flood risk, but would also treat

[35] Local Agenda 21 was developed at the Rio Earth Summit 1992, as a framework for local strategic action towards sustainable development (Dooris 1999).

diffuse pollution. Furthermore, flood risk downstream would not be worse than that existing at that time and if possible was to be reduced (Development Control Committee 1998).

5.2.4 First outline planning application

The consortium of developers prepared a proposals document, which was submitted as part of an outline planning application in August 1998. Through consultation, NCC received 54 letters from local residents, 30 of which were from Brunton Park. Most objections were regarding development on green belt land (26 in total), but interestingly, even though there had been past concerns from residents regarding flood risk, no such objections were made this time. The EA welcomed the application, because it maintained the natural floodplain and all development was outside the 1-in-100-years flood zone. They also supported the use of sustainable drainage. The Civil Aviation Authority (CAA), which was a statutory consultee for any applications near airports, examined the application in terms of bird strike risk. They did not foresee any problems with the SuDS, provided that, in the detailed phase, intentions in respect of bird control were adhered to (Development Control Committee 1998).

On the basis of the consultation, the developers revised their proposal document, which was transformed into the master plan for NGP as a Supplementary Planning Document in November 1998. The agreement was that the developers would consult with and meet all statutory requirements of the EA in relation to flood control and surface drainage. The developers and the council would also work together to implement appropriate sustainable drainage techniques, in particular the use of ponds and wetlands for surface water storage and treatment. The council agreed in principle to maintain the SuDS as part of the strategic open space (Newcastle City Council 1998b). When the application was discussed in the Development Control Committee, they indicated that they recommended granting permission. However, the application had to be referred to the SoS on highway grounds (Development Control Committee 1998). The SoS called in the application on February 1999, but not on flood risk issues (Cahill 2000). The public inquiry was planned for September 1999 (Newcastle City Council 1999a, 1999b).

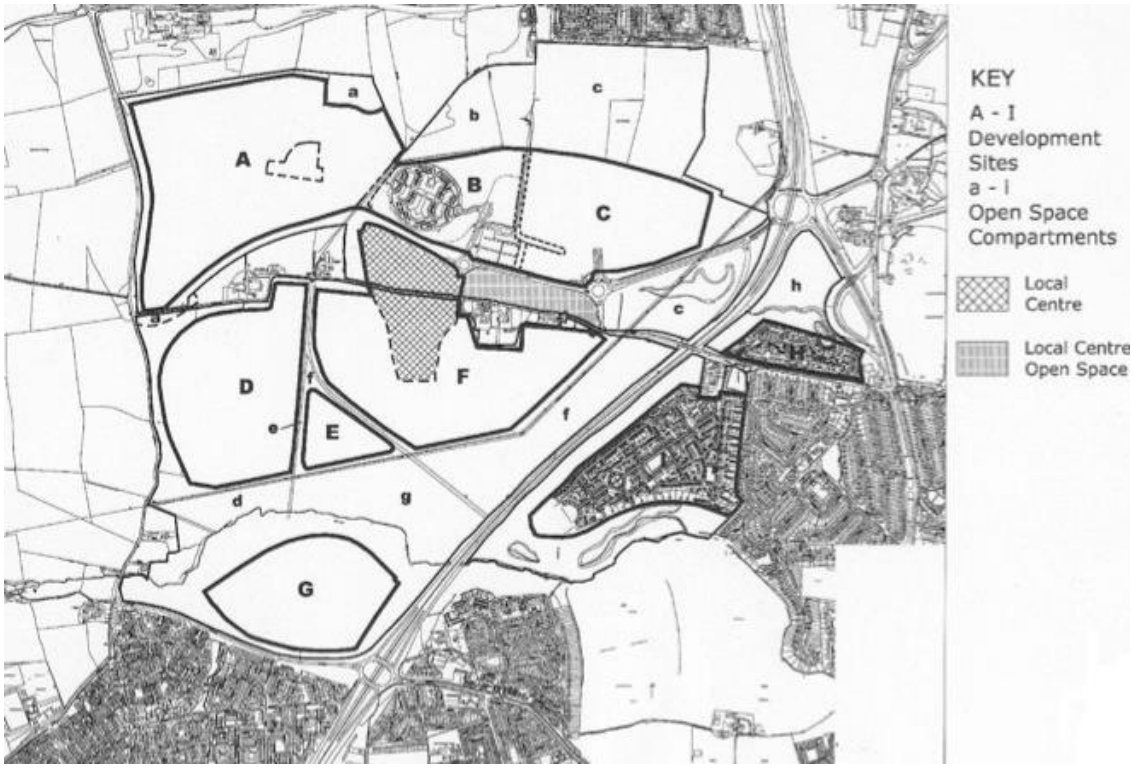

Figure 15: The development cells in Newcastle Great Park
Source: Adapted from Newcastle City Council 2007: 13

During the summer of 1998 there were several incidents of flooding near NGP, mainly in Brunton Park, which left residents increasingly angry (Northern Development Area Sub Committee 1998c). For instance, in public meetings residents living near the development area raised concerns that NGP might increase flood risk. The consortium, in the meantime, commissioned a drainage report on the use of sustainable techniques, which concluded that the most suitable measures for existing ground conditions were the use of ponds close to the Ouseburn and Letch. The visual appearance, maintenance and safety issues were being assessed. The EA checked the capacity of the ponds and was content (Northern Development Area Sub Committee 1998b, 1998d).

5.3 Second outline planning application

In August 1999, the master plan for NGP was adopted as Supplementary Planning Guidance. A month later and before the public inquiry was to take place, the consortium withdrew their planning application and submitted a new one the next day (Newcastle City Council 1999c, Newcastle Great Park Advisory Committee 2001c). The Northern Development Area was now officially called Newcastle Great Park in press releases and in the council's bulletins (Newcastle City Council 2000a). This revised application

solved the issues raised by the SoS on transport and sustainability and the application was not called in (Cahill 2000, Newcastle City Council 2000a, Woods 2000).

Furthermore, NCC decided to take the development forward as part of the Going for Growth initiative. Going for Growth was a regeneration strategy applied by the council between 1999 and 2004 to address population loss and stimulate economic growth. NGP was seen as an important part of this strategy, by assisting in 'reversing the trend of outward migration as part of city-wide regeneration initiative through a sustainable development' (Newcastle City Council 1998a: 5) in addition to boosting economic growth. Therefore, NCC decided to develop NGP in parallel with demolition of existing housing stock and with regeneration projects in the city (Newcastle City Council 2000a, Cameron 2003).

The issues with flood risk and drainage were investigated in the Environmental Statement submitted with the application (Nathaniel Lichfield and Partners 1999), which repeated existing knowledge. The Ouseburn was described as having a history of flooding, which together with the Letch might flood part of the site. Moreover, the runoff from the development was expected to greatly exceed greenfield site runoff and increase flood risk downstream. It was felt that traditional drainage would discharge surface runoff water into the watercourse more rapidly than would occur naturally. At the time no statutory standards existed for protection from flooding, but EA policy was followed, which protected urban areas against a 1-in-100-years flood event.

The Environmental Statement claimed that the physical attributes of the site and the outline layout plans provided opportunities to include SuDS. Various sustainable options were listed, such as storage ponds, wetlands, swales, infiltration trenches, water butts and permeable car parks, drives and roads. The recommendation was to use storm water wetlands with storage in parkland areas adjacent to Ouseburn and Letch.[36] Additionally, the natural floodplain of the Ouseburn was to be preserved or widened to provide additional storage of floodwater (Nathaniel Lichfield and Partners 1999). Knowledge of flood risk in NGP at the time of the outline planning permission was mainly based on a flood risk map derived from a Section 105 study[37] that was carried out in the 1990s. Another study in 1999 by the EA mapped the floodplain of the

[36] The use of infiltration methods was disregarded due to clay subsoil.
[37] Named after Section 105 of the Water Resources Act 1991, which required the EA to carry out surveys of key watercourses for flood defence purposes.

Ouseburn. Based on this information, the development of NGP was based outside floodplain boundaries.

Consultation was carried out based on the outline planning application. The EA and the CAA upheld their original statements from the previous application. However, residents sent many more letters of objection compared to the first application: 330 compared to 54. In total, 165 objections were against development in green belt land; 101 objections were about the development not being sustainable; and there were 99 concerns about the lack of consideration of local hydrological patterns and drainage issues and the subsequent increased risk of flooding. In addition, 333 residents, mainly in the Gosforth area, signed a petition, whilst other residents submitted 300 copies of a standard objection that was prepared by ward councillors from the Liberal Democrat party. This increase in objections, including objections on flood risk issues that were lacking in the previous application, may have been the result of successful lobbying of some residents and other interested parties.

The Development Control Committee discussed the concerns relating to flood risk, stating there had been existing and longstanding problems in Brunton Park in storm conditions and more recently with water and sewage spillage in the Red House Farm Area. The committee felt that the developers, the EA and the WaSC had considered flood risk sufficiently and the committee relied on the EA's statement that they were satisfied that the SuDS would contain runoff from the site. They therefore recommended granting planning permission (Development Control Committee 1999, Newcastle City Council 2000a).

After another flood event in Brunton Park in the summer of 2000, councillors called a meeting between residents, the council, the EA, the WaSC and the local golf club, which had also suffered from flooding. It became apparent that residents were still concerned that NGP might increase flood risks, even though the EA indicated they were satisfied with the planned flood risk measures. During a subcommittee meeting a councillor conveyed the residents' concerns, but other members argued that the subcommittee was not the right platform to discuss residents' concerns and the problem should be dealt with outside the committee between the EA and associated parties (Northern Development Area Sub Committee 2000).

The outline application was approved in October 2000 and the foundations for the use of sustainable drainage were laid. The outline planning permission required that for

each development cell (see Figure 15) a development site strategy statement (DSSS) would have to be submitted. The DSSS set out the overall strategy for development and public open space, including the SuDS. In 2001, the first cells received planning permission and construction commenced with Cells H and I, including the SuDS ponds.

Figure 16: SuDS in Cell G, Newcastle Great Park
Source: Author 2012

The SuDS are designed to a 1-in-100-years storm return period and are 'end-of-pipe' systems, meaning that in the development conventional drains and underground pipes are used, but instead of these entering the sewers, the water flows into the ponds. No permanent open water features are included, as this would increase the risk of bird strike at the nearby airport. In Cells B, C and H, two permanent wetlands have been created, which slowly release into the Letch. In Cell I, another permanent wetland is created that slowly releases into the Ouseburn. In addition, there is a permanent wetland installed adjacent to the A1, which would allow the highway to drain into this feature if it is widened in the future. In Cell G, the SuDS are located north and south of the Ouseburn and are connected to the river. At normal river levels, the ponds slowly drain into the river, but when river levels are high, the river is allowed to flow into the ponds (Figure 16) (Newcastle Great Park Advisory Committee 2004j, Newcastle Great Park

Consortium n.d.). Lastly, the Letch was returned to a more natural, curved outline as part of new open space, instead of remaining a straight channelled ditch (Newcastle City Council 2003).[38]

5.3.1 Revision of the master plan

Soon after the outline planning permission was granted, a new PPG on housing was published. This policy strived for new developments to be built in greater densities (ODPM 2000), which conflicted with the lower housing densities in NGP. Therefore, the planners and developers agreed to develop a revised master plan to increase housing numbers and in January 2001 the developers produced revised concepts (Newcastle City Council 2001).

The fragmentation of responsibility concerning surface water drainage inside and outside NGP became increasingly problematic. In November 2000, this issue was discussed in the subcommittee and the EA and the WaSC were present to answer questions. The WaSC made clear that they could not be legally responsible for SuDS. NCC stated that NGP was not expected to cause an increase in flood risk, but the developers could not be responsible for existing problems in surrounding areas. NCC compiled a report on responsibility for surface water drainage, stating that the fragmentation of responsibilities was a cause for concern and necessitated close liaison and cooperation on all sides. However, it also claimed there had been improvements in the integration of planning and flood prevention in recent years (Northern Development Area Sub Committee 2000, Newcastle Great Park Sub-Committee 2001f). In January 2001, the planning department wrote a note on drainage issues, saying that they had received concerns from residents, who blamed NGP for increasing flood risk in their neighbourhood. They stated they were aware of the existing problem in areas surrounding NGP and that the EA was remodelling flood risk around the Ouseburn (Newcastle Great Park Advisory Committee 2001b).

In the meantime, the subcommittee had been abolished and the Newcastle Great Park Advisory Committee was established. This committee would oversee the implementation of NGP and would hold regular meetings where planning officers, other council officers, councillors, developers, the WaSC and the EA could discuss any issues arising, including drainage. The committee did not make any decisions, but provided a

[38] Additional photographs of the SuDS are shown in Appendix M.

forum for councillors and officers to talk about any concerns. These meetings were open to the public and on some occasions residents would speak, for instance to raise concerns with flooding (Newcastle Great Park Advisory Committee 2005g). In one of the meetings, the release of PPG25 was discussed. The committee formulated a response to central government in which they noted that a clarification of responsibilities for SuDS after construction was required (Newcastle Great Park Advisory Committee 2001a). The committee therefore used their experience with SuDS to comment on emerging national policy on FRM, by highlighting issues with maintenance and adoption.

In the meantime, knowledge on flood risk in the Ouseburn developed. In 2000, the EA had commissioned a new Section 105 survey for the Ouseburn and, for the first time, its tributaries also, including the Letch (Newcastle City Council 2003). The final report was received in 2002 and was perceived to be more reliable than the previous Section 105 survey from the 1990s, as it applied a more detailed physical survey combined with new data gathered during storm events, although it did not include any possible climate change effects. The new survey showed that flood risk was higher than previously thought for some areas along the Ouseburn and the Letch. This also affected parts of Cells G and I, which meant that development plans had to be altered and flood control in the Ouseburn became of higher importance (Development Control Committee 2002a, Newcastle Great Park Advisory Committee 2005f).

The DSSS for Cell I was submitted for planning permission in late 2001. The Ouseburn runs through the southern part of the site and during consultation, the EA and residents in the surrounding area expressed concern that some of the housing would be within the floodplain. The southern boundary was amended following a survey and all houses were moved out of the 1-in-100-years floodplain (Development Control Committee 2002a). In the media, the issue of flood risk had also come forward. In an article in the *Newcastle Journal* from 2001, it was reported that the developers ensured that no houses were built in floodplains and that the drainage system prevented any flooding (Hedley 2001).

In 2004, several consecutive days of heavy rain caused flooding problems in Newcastle. The golf course adjacent to NGP and other areas experienced sewer flooding. Residents were concerned that the flood had been caused by the new development, but it was later found that these problems were not linked to NGP (Newcastle Great Park Advisory

Committee 2004e, Newcastle Great Park Advisory Committee 2004i). Within NGP, the storage pond in Cell C overflowed and the water level of the Letch was very high (Newcastle Great Park Advisory Committee 2004c). The ponds in Cells B and C were at or above their design depth for a 1-in-100-years storm, whilst the experienced rainfall had not been as heavy as this. Therefore, the EA and the council were concerned that the SuDS were not functioning properly. The construction of the SuDS was the responsibility of the consortium, but they claimed the SuDS had been built to the specifications of the EA and the WaSC. The council started considering introducing independent inspections and the EA asked for surveys that the ponds had been constructed as agreed. An investigation later revealed that the Letch had been leaking into the SuDS, which meant the pond was taking in river water and rainwater, which caused it to overflow (Newcastle Great Park Advisory Committee 2003b, 2004d, 2004h, 2004j, EA Officer A 2012, interview).

In the meantime, consultation took place on the revised master plan, showing that people's concerns on NGP exacerbating flooding in the area had not been appeased. Two people indicated that they had concerns that the development would increase flood risk elsewhere (Newcastle Great Park Advisory Committee 2005b). Others claimed water was flowing faster through the Ouseburn after development had started, but the EA found no evidence for this (Newcastle Great Park Advisory Committee 2005e).

5.3.2 Planning application for Cell G

During the preparation for a detailed planning application for Cell G, flood risk again became an important issue. The plans for Cell G had been to build 450 residential units on 20 hectares of land between Kingston Park and the Ouseburn (Newcastle Great Park Advisory Committee 2003a). No pre-application discussions took place with the officers and the first application was not registered due to insufficient information. At this time, the relationship between the council and the developers had worsened, as the council wished to revise the master plan for the whole development, whilst the developers wanted to develop cell by cell instead (Gosforth and North Newcastle Area Committee 2003). After a meeting between the council and the developers, plans for Cell G were adapted, including a reduction in housing numbers to 320. Subsequently, a new application was submitted (Newcastle Great Park Advisory Committee 2004b, 2004g).

At the time of the outline planning permission it had been known that Cell G was partly within the floodplain and that the low-lying fields of the wider area flooded after heavy rain (Council Engineer 2012, interview, Councillor B 2012, interview). At that time, the dwellings were planned outside the 1-in-100-years floodplain. However, when the EA carried out a new Section 105 study of the Ouseburn, part of Cell G became located within the floodplain (see Figure 17). Instead of changing the contours of the development, or reducing the numbers of houses to be built, the developers and EA agreed to raise the land for development above the 1-in-100-years floodplain level and to construct the properties on piles. Excavation in areas along the Ouseburn compensated for the loss of floodplain and provided lost water storage through SuDS ponds (Newcastle City Council 2004, Newcastle Great Park Advisory Committee 2004a, 2004f, 2005a). As a result of these works, development Cell G would again be outside the 1-in-100-years floodplain (see Figure 18) and therefore the area did not require a sequential test as described in PPG25 (Newcastle City Council 2004).

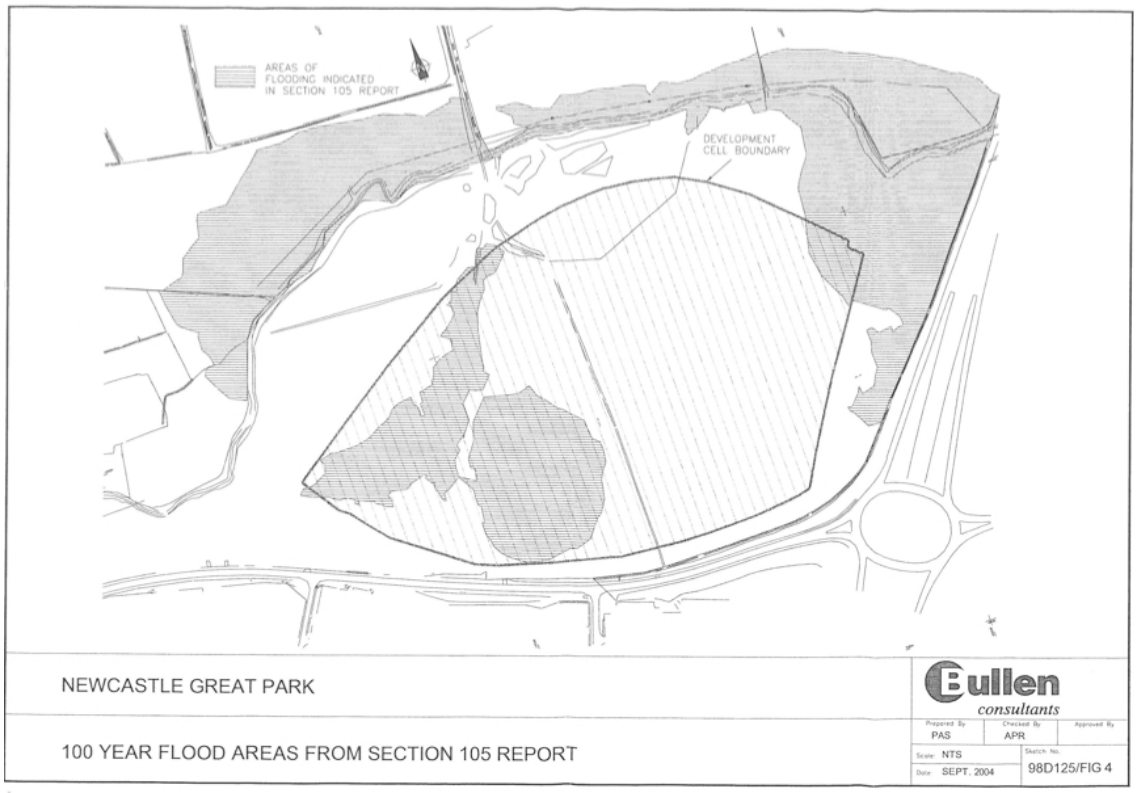

Figure 17: Flood risk according to Section 105 survey in Cell G
Source: Newcastle City Council 2004: 43

The SuDS ponds in Cell G are of a different nature than the other ponds on the site. They are end-of-pipe ponds, which collect surface water from the development cell. Before the SuDS were installed, the area still suffered from drainage problems, but

when the SuDS were finished, this flooding did not reoccur (Councillor B 2012, interview). However, they also enable the Ouseburn to flow into the ponds if the river's water levels are high. This lowers flood risk downstream of the Ouseburn.[39]

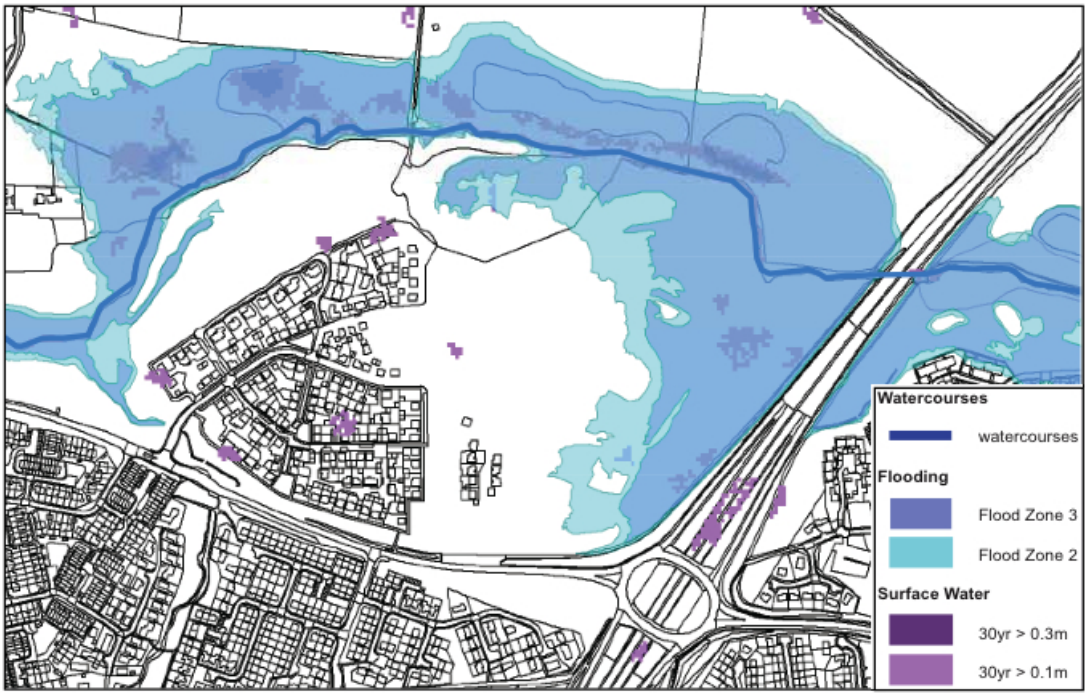

Figure 18: Current flood risk in Cell G
Source: Adapted from Newcastle City Council 2013a: 10

The SuDS did not appease the concerns of nearby residents. During consultation it became clear that some residents were still concerned that the development of Cell G would increase flooding in surrounding areas. Councillors requested confirmation from the EA that the proposed drainage system would not increase flood risk, even though the EA had already indicated this to the council (Development Control Committee 2005).

5.3.3 Subsequent flood events

In April 2005, heavy rainfall produced high water levels in the Ouseburn, overflowing storage ponds in Cells B and C. This caused concerns with residents in NGP (Newcastle Great Park Advisory Committee 2005c, 2005d). An inspection revealed that the Letch was leaking into the SuDS, whilst the ponds had low spots that needed to be raised to the correct design specification. The ponds had therefore not been constructed as

[39] Photographs of the SuDS ponds are shown in Figure 16 and Appendix M.

requested and the developers had to rectify the problems (Newcastle Great Park Advisory Committee 2005g). In June and August of the same year, heavy rainfall caused sewer flooding in Gosforth and the Red House Farm estate, although not in NGP. Again, there were concerns that the new development exacerbated the problems with flooding. However, later investigations as part of a new study commissioned by the EA revealed that NGP was not to blame for flooding in nearby areas (Atkins 2006).

Figure 19: SuDS in Cell I
Imagery: Infoterra Ltd & Bluesky
Source: Google Maps 2011

In fact, the new study found that the Ouseburn had frequently flooded in the past. The worst flood events had been in 1900 and 1903, which were 1-in-100-years flood events causing much more damage than any later flooding events. Minor floods occurred in 1978, 1979, 1992, 1993 and 2000, which were between 1-in-2 and 1-in-25-years flood events. However, even though these flood events were less severe, the consequences were much larger, because much more development had taken place along the Ouseburn. New developments were composed of large areas of impermeable surfaces, some of which were in the floodplain, whilst bridges and culverts were added and the river was narrowed. Surface water runoff from new estates built in Newcastle and North Tyneside, and from the airport, the A1 and other highways were all directed into the Ouseburn. In particular, Kingston Park and Red House Farm impacted directly on river flows; in one event in July 2007, surface water runoff from Kingston Park contributed to almost 80% of the total river flow.

As a consequence, the Ouseburn now reacts very quickly to rainfall events. As river levels rise sharply in short periods of time, fluvial flood risk is created. For instance, in

Brunton Park, five houses and 60–70 gardens have fluvial flood risks. Moreover, some of the developments' surface water sewers drain directly into the Ouseburn. When river levels are high, water is forced back into the sewer. This water will then flow into the foul sewer, causing sewage to come up through drains in roads and houses. This is what occurred at Red House Farm even after the WaSC had installed a large underground storage tank. However, the development in NGP had not increased flood risks in these areas (Newcastle Great Park Advisory Committee 2005c, 2005g, 2005h, 2010, Atkins 2006, Climate North East 2008).

5.3.4 Maintenance and adoption issues

In the meantime, there were issues around responsibility and maintenance of the SuDS. The consortium was unsure who would be responsible for the SuDS and found that the WaSC and the EA were unable to adopt them:

> In the first years we did not understand who was going to adopt, but the Environment Agency does not adopt SuDS ponds and we never will. What our remit is has been clarified through the Floods and Water Management Act 2010: it is to provide a national overview of flood risk matters.
>
> (EA Officer A 2012, interview)

> We had meetings with the consortium around 1998, 2000 and 2001, where they kept asking the question [if the WaSC would adopt the SuDS] and they got a firm: 'No, we won't adopt them'. Section 104 of the Water Industry Act allows a developer to ask us to adopt sewers. There is nothing in the definition of the SuDS ponds that actually makes it a sewer, so we were unable to adopt them.
>
> (WaSC Officer 2012, interview)

Neither the EA nor the WaSc were therefore able to take responsibility for the SuDS ponds. The EA was responsible for ensuring the ponds would manage flood risk sufficiently, whilst the WaSc was responsible for the underground pipes running into the SuDS ponds (WaSC Officer 2012, interview), but they would not be able to adopt or maintain them.

Instead, responsibility was arranged in a Section 106 agreement, which was signed in October 2000. This agreement set out various obligations by the developers, including those concerning SuDS. The SuDS in the s106 agreement became part of the strategic open space, which the developers created and maintained for three years. However, it was still unclear if after three years the council or a management company would take

up the maintenance of the open space; this would be arranged in a revised s106 (Newcastle Great Park Sub-Committee 2001g).

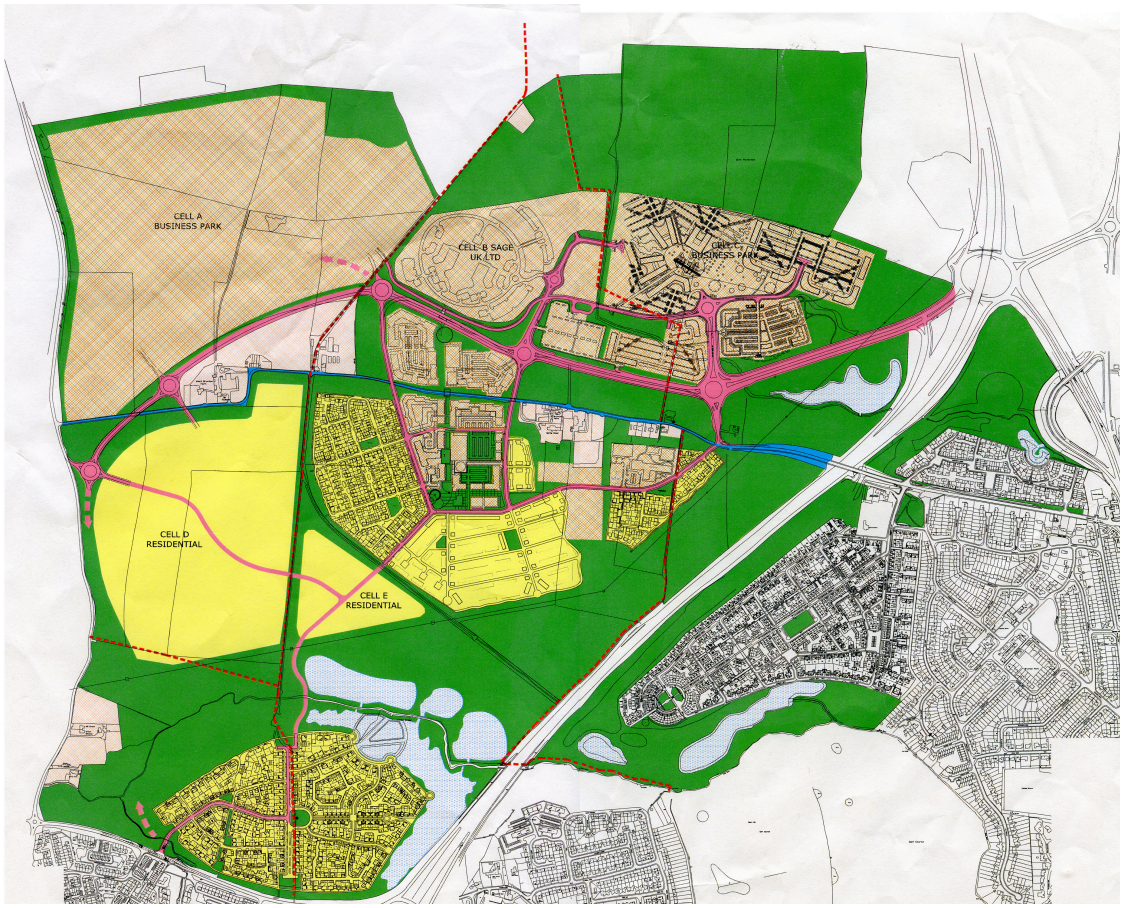

Figure 20: Plan of Newcastle Great Park including SuDS
Source: Newcastle City Council n.d.

The s106 agreement was revised in 2010, because housing numbers had risen in the meantime. In this agreement, the responsibilities for SuDS were set out in more detail. NCC and the developers agreed that the developers owned the freehold of the land until the council took over and issued a certificate of adoption. NCC would take over after the developers had built the SuDS to a specified standard, confirmed by an independent survey. NCC also inspected the SuDS, funded by a provision of £200,000. Moreover, a management company was established to carry out the maintenance in the area of NGP west of the A1, where the majority of open space was located. This company was set up by the consortium and funded by fees paid by residents[40] (Councillor B 2012, interview, LRA Chair 2012, interview). The maintenance of the SuDS was carried out according to a maintenance schedule set out in the s106 agreement, which also included maintenance

[40] The fee is dependent on the value of the property, for instance in Cell G the fee is typically between £500 and £600 per year (LRA Chair 2012, interview).

of reeds in accordance with the airport's requirements. Finally, the agreement included health and safety reports to ensure the SuDS were safe for residents (Newcastle City Council 2000b, 2010, Development Control Committee 2002b, Newcastle Great Park Advisory Committee 2009a, 2009c, Council Engineer 2012, pers. comm., Planning Officer A 2012, interview).

For both the original and the new s106 agreement, the future costs for the SuDS proved to be an issue. The planning officer involved in the original s106 agreement felt that lack of experience with SuDS and the pressure of proceeding with the development meant that not enough funds were secured to cover future maintenance of the SuDS (Planning Officer B 2012, interview). The developer on the other hand felt that the council wanted much more than was justified when the new s106 agreement was negotiated. The developers had been maintaining the SuDS for several years and believed they knew what the yearly maintenance costs were, which were much lower than the council was requesting (Developer A 2012, interview). However, both the planner and developer agreed that maintenance issues were complex. According to the planner: 'the cost of management and maintenance had been more of an issue of disagreement that the actual design' (Planning Officer B 2012, interview), whilst the developer agreed that 'who takes responsibility is more complicated than the actual mechanics of SuDS' (Developer A 2012, interview).

The maintenance and adoption of the SuDS caused concerns with councillors and residents. Firstly, because the developers created the management company, the quality of the maintenance of the open space and SuDS might be compromised:

> It is the management company that is going to have that responsibility and I really do not know what sort of expertise or knowledge they have. I think they are going to be more concerned about grass cutting, tree planting and litter bins than the SuDS … It needs to be someone who knows what they are talking about, not someone who just says: 'They look all right'.
>
> (Councillor B 2012, interview)

Secondly, residents found that because the management company is a private venture, they do not reveal their expenditure. Therefore, residents do not know how their fees are spent. In addition, they are unable to communicate with the management company directly. Thirdly, the fact that the council is not responsible for maintaining the open space causes confusion. The council, for instance, collects refuse, but the consortium maintains open spaces. As residents are paying council taxes and management fees, they

have concerns that they are paying double for services (Councillor B 2012, interview, LRA Chair 2012, interview). Fourthly, there are concerns over the maintenance schedule. The question is whether the schedule covers all eventualities:

> It is a little bit of a no man's land at the minute. They [the SuDS] have not been in long enough to find out how much maintenance they actually need. They are still pretty new and modern and working, but 15 years down the line what is going to happen, or if cracks develop how do we cope with that?
>
> (Councillor B 2012, interview)

Finally, adoption is taking much longer than originally planned. The SuDS are part of the open space, which is not yet finished and adopted, partly because of the issues with the operation of the SuDS. For instance, there were a few incidences of leaks, blockages and soapy water entering the ponds that took time to rectify, which delayed adoption (Developer A 2012, interview). The council and the EA wanted to ensure the SuDS worked properly before adoption took place, for instance through as-built surveys and independent inspections. Moreover, the council wanted to see the maintenance schedule in place and working before adoption (Newcastle Great Park Advisory Committee 2010).

5.3.5 Continued development

In the meantime, North Gosforth and the Ouseburn became an Integrated Urban Drainage pilot study in 2007, funded by Defra as part of the Making Space for Water strategy. This project examined the relationship between the sewers and the Ouseburn and aimed to develop an integrated approach by overcoming organisational barriers. Through workshops with residents in the Ouseburn catchment, issues with NGP arose again. Residents were still uncertain about the operation and the management of the SuDS (PURE Ouseburn 2006). Some still felt that NGP was contributing to flooding (Newcastle Great Park Advisory Committee 2007a, 2007b). Residents also resented the fact that the developers had not attended any meetings, leading to 'an "us and them" mentality' (Ouseburn Catchment Steering Group 2009: 7). As a result, they thought that they could not raise issues caused by developers to them directly, but instead they had to report issues to the EA or to the council; however, they felt that the council was not enforcing any planning issues sufficiently.

In September 2008, an important flood event occurred. Rainfall that caused flooding in Morpeth also impacted on the Ouseburn. The river broke its banks, and sewers

overflowed, resulting in the flooding of 30 properties. In Brunton Park, the Ouseburn overflowed and flooded a small area, but the overflowing sewers proved to be a greater problem (Councillor A 2012, interview). Although no houses were flooded in NGP, residents were concerned that the Ouseburn had flooded into the SuDS pond in Cell I, thereby increasing flood risk downstream (WaSC Officer 2012, interview). However, the developer claimed that even though the Ouseburn had been running at a very high level, the SuDS did not overflow (Newcastle Great Park Advisory Committee 2008a, 2008b, 2009d). The council also claimed that the system had coped well; they considered it a good test of the SuDS, because the storm was almost a 1-in-100-years event, therefore testing the system's limits (Planning Officer A 2012, interview, Council Engineer 2012, interview).

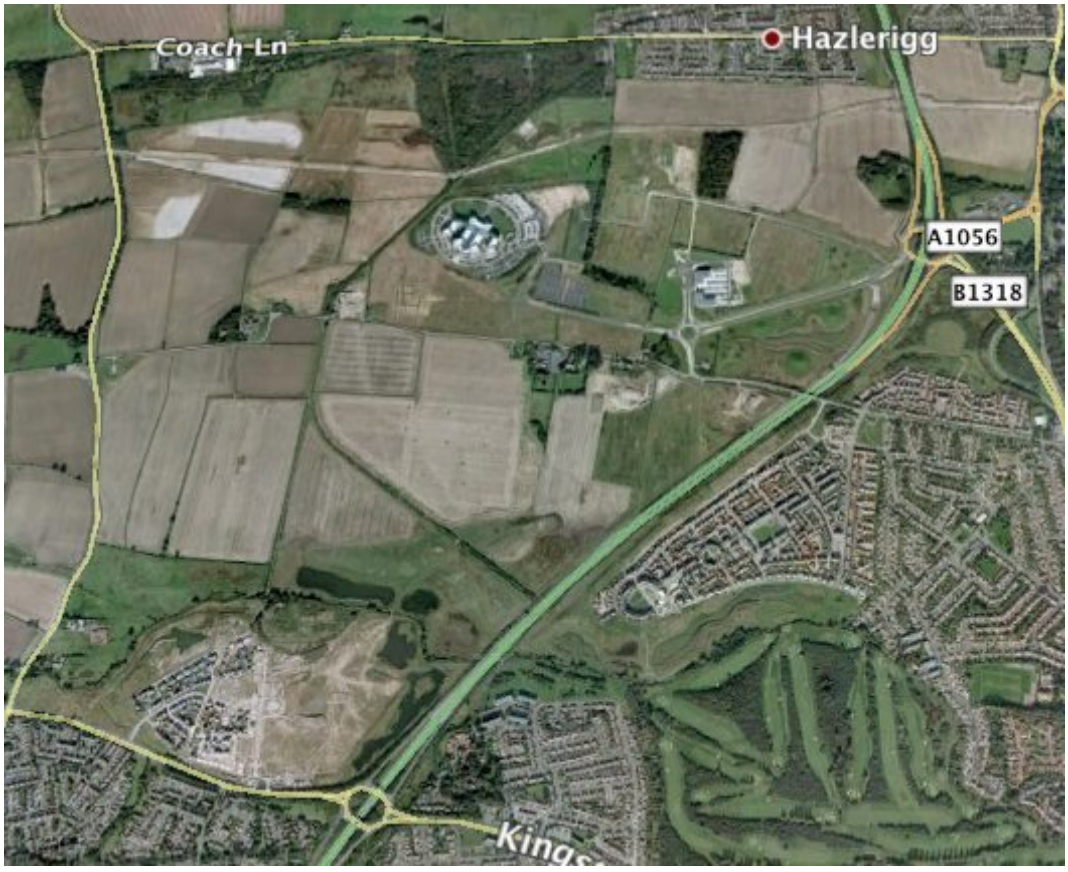

Figure 21: Aerial photograph of Newcastle Great Park in 2008
Imagery: Infoterra Ltd & Bluesky
Source: Google Maps 2011

In addition, this event provided the EA with much information about flood risk. As the WaSC officer stated:

> The flooding event of 2008 was probably the biggest event they [the EA] ever had to be able to measure. That gave a whole host of new data about

> the levels to which the Ouseburn could rise and as a result, they have had to refresh the database.
>
> (WaSC Officer 2012, interview)

The EA used the data from this event by including it into a remodelling of flood risk, which was completed in 2011. This modelling showed that the pond in Cell I thought to be outside the Ouseburn's floodplain was now in fact within it. This meant that if water levels were high, surface water runoff retained within the pond could overflow into the Ouseburn and aggravate flooding downstream (WaSC Officer 2012, interview). In addition, in Cell G some of the green space turned out to be at risk of flooding (EA Officer A 2012, interview). Therefore, a public event was held on June 2009 to inform residents on progress with flooding issues (Newcastle Great Park Advisory Committee 2009b). However, some residents and the media had formed a negative image of NGP and flood risk issues; for instance, one newspaper reported that the area was 'being plagued with flooding', even though it gave no examples of floods (Hughes 2011).

Figure 22: Development in Newcastle Great Park Cell F
Source: Author 2012

In 2011, the Newcastle Great Park Advisory Committee was abolished when the Labour Party took over control of the council from the Liberal Democrats and the number of committees was reduced. However, according to the planning officer, the committee had also run its course. It was originally established to discuss strategic issues, but had slowly developed into discussing day-to-day issues that were better resolved directly between the parties concerned. To compensate for the loss of the committee, regular

informal meetings still took place between the council, developers and councillors and regular reports were sent to ward committees (Planning Officer A 2012, interview).

In 2012, development in NGP was still taking place. Cell G was under construction, whilst work also started on the town centre. In addition, more SuDS may be constructed in the future:

> Some of the development cells may change. At the moment we have planning permission for residential development and it is also possible that some of the business areas may well change in the future and become residential. The housing numbers will certainly increase over 2,500 and if that is the case then there may be a requirement to introduce new SuDS that are not showing on the plans so far.
>
> (Planning Officer A 2012, interview)

The existing SuDS were now also working according to requirements. Since the SuDS went into operation, no fluvial or pluvial flooding has taken place in NGP (Councillor B 2012, interview). For instance, after the heavy rainfall in Newcastle in June 2012, the SuDS ponds were approximately three-quarters full and did not overflow (EA Officer A 2012, pers. comm., Councillor B 2012, interview). However, there were concerns that the development of Cell G caused surface water flooding in Kingston Park. The surface water runoff in this area used to run through the fields in Cell G and into the Ouseburn, but as the houses were built and land was raised, the runoff backed up into Kingston Park, requiring further drainage measures to be taken there (Councillor B 2012, interview). Therefore, knowledge of drainage and flood risk in NGP and the surrounding areas is continuously developing and flood risk measures are taken accordingly.

5.4 Summary

This chapter described the development of NGP and the decisions made to manage flood risk. The concept of NGP started in the 1980s, when planning officers at NCC identified housing need, population loss and unemployment figures that were higher than surrounding areas. As they found there was inadequate land within the city for development, their solution was to create a development in green belt land north of the city that would include mainly higher-market housing, together with areas for commercial development. The development aimed to be sustainable to compensate for the loss of green belt land and to attract buyers. Even though there was much opposition

from residents and interest groups, planning for the development proceeded with support from central government.

The planning officers were aware of flooding issues in the Ouseburn area. They were aware that a large-scale development created much surface water runoff, which if released into the Ouseburn would exacerbate problems with flooding downstream. In addition, there were some fluvial flood risks in NGP itself. The planning officers and the EA developed the idea to use SuDS to address the flooding problems, which the developers agreed with. As a result, end-of-pipe SuDS ponds were constructed that slowly released surface water into the watercourse. The SuDS ponds in Cell G were more advanced, as they also allowed the Ouseburn to flow into the ponds when water levels were high, effectively reducing flooding downstream.

Over the years, various flood events occurred around the Ouseburn[41] and residents were worried that the flooding was caused or aggravated by NGP. There was concern that the SuDS were not working correctly and there were instances when faults were found with the ponds. In addition, knowledge of flood risks developed over the years, in particular after a flood event in 2008, which meant that flood risks for the Ouseburn were greater than previously thought and some SuDS ponds had to be adapted. This reduced confidence amongst residents of surrounding areas and they had concerns that the authorities were not effectively tackling the problem of flooding.

Another issue was with the maintenance and adoption of the SuDS. The local authority was the only body able to adopt them, but there was uncertainty concerning the costs of future maintenance. In addition, a private management company was established to maintain the SuDS using fees paid by residents. This created problems with accountability; for instance, if maintenance is needed that is not included in the maintenance agreement. Moreover, the residents preferred the local authority to be responsible for maintenance, because they feel that the management company is non-transparent and communication is lacking.

Chapter 7 will analyse the case of NGP according to the theoretical framework, to identify the key issues that influenced FRM. Before that, the next chapter describes the second case study of this research, which is Chelmsford's cricket ground development.

[41] In the years 1999, 2000, 2004, 2005 and 2008.

Chapter 6 Chelmsford cricket ground development

6.1 Introduction

This chapter describes the second case study of this research, which is the redevelopment of the cricket ground in Chelmsford. Section 6.2 describes the decision-making process chronologically, after which section 6.3 provides a short summary. This chapter has been informed by documents collected,[42] interviews with participants and a site visit. An analysis of the data based on the theoretical framework is undertaken in Chapter 7.

The borough of Chelmsford comprises countryside, villages and towns. A large proportion of the borough's population resides in Chelmsford, the county town of Essex. Chelmsford originates from a Roman settlement at a river crossing and has been steadily growing in population ever since (Fuller and Home 2007). This continuous growth can partly be explained by the location of Chelmsford within the London commuter belt. In 2001, 17% of the resident workforce commuted to London (Chelmsford Borough Council 2008e, 2008i). In 2011, Chelmsford had approximately 168,300 inhabitants (Office for National Statistics 2012) and gained city status in March 2012[43] (Deputy Prime Minister's Office 2012, Nicholson 2012).

The main watercourses that pose a flood risk in Chelmsford borough are the rivers Can, Wid and Chelmer (Scott Wilson 2008). The river Chelmer runs mainly through rural areas, with the exception of the town of Great Dunmow and Chelmsford itself. The river Can, which is the river running past Chelmsford's cricket ground, is a major tributary of the river Chelmer and they join in the centre of the town. The Wid is a tributary of the river Can; they join west of the town (Environment Agency 2006). The presence of these three rivers cause approximately 1,000 to 1,500 domestic and commercial properties in town to be located in a 1-in-100-years flood zone, together with various brownfield sites that the council have earmarked for regeneration (Planning Officer D 2012, interview). The cricket ground development has not previously been researched in academic literature.

[42] For a complete list of collected documents, see Appendix F.

[43] In this chapter, the local government of Chelmsford will be referred to by its previous name of Chelmsford Borough Council, which was in use at the time of the cricket ground development planning process, as opposed to its current name of Chelmsford City Council. In addition, as most of the events detailed in this chapter took place before March 2012, Chelmsford is referred to as a town throughout.

6.2 Context and development of the cricket ground

Chelmsford has much experience with flooding. The rivers that run through the centre have flooded frequently in the past, and after damaging floods in 1947 and 1958, a flood relief scheme was implemented. This engineered approach to controlling flooding entailed raising flood embankments and installing sluice gates that retain a high water level in the centre for aesthetic purposes and allow water through at times of flooding (Environment Agency 2006). The scheme was designed to reduce loss of floodplain to a minimum; therefore, areas such as recreation grounds, tennis courts and the cricket ground beside the river remained unprotected.

Figure 23: Aerial photograph of Chelmsford cricket ground
Source: Chelmsford Borough Council 2004: 1

In the town centre and adjacent to the river Can, several sports and leisure facilities were established. In 1925, the cricket club established their ground, which is one of 18 first class county grounds in England and Wales (England and Wales Cricket Board 2000, Essex Cricket n.d). In 1993, the cricket club added a car park on the banks of the river (Cushman and Wakefield 2008a).

6.2.1 Inclusion of the cricket ground in Chelmsford's Local Plan

In 1997, Chelmsford Borough Council (CBC) published a Local Plan, Chelmsford's first borough-wide plan (Chelmsford Borough Council 1997). The plan described the development pressure present in Chelmsford, caused by economic growth and its proximity to London. Substantial new development had been taking place in the previous 40 years, mainly on the peripheries of Chelmsford. Therefore, the plan aimed to provide for the development requirements of the borough, within certain conditions, including the protection of green belt land and river valleys in the town centre and in the countryside. Even though the Local Plan encouraged housing in urban areas, it also wanted to avoid town cramming and no new housing sites were planned in the centre, but instead land was reserved for retail and employment uses.

The risk of flooding was an important development consideration. Based on Circular 30/92, the EA would be consulted before granting planning permission to a development in an area of flood risk or where there were drainage problems. Parts of the borough were at flood risk and CBC found it 'unrealistic to expect that all such risks [could] be eliminated' (Chelmsford Borough Council 1997: 188). In areas at risk of flooding there was a presumption against new development, but such areas were allowed to flood in order to protect others.

Furthermore, the plan emphasised the importance of leisure activities in the town centre, because this ensured accessibility for the community and enhanced the attractiveness, diversity and liveliness of the town centre. Additionally, it was stated that the demand for most recreation facilities had increased considerably. CBC therefore wanted to retain these facilities, as they had:

> too often been lost as a result of over-intensive development and redevelopment. This has led not only to the loss of valuable open-areas but a cramped environment and town-cramming.
>
> (Chelmsford Borough Council 1997: 90)

In particular, the football club and the cricket club were considered vital. CBC stated that these two clubs made a significant contribution to the attractiveness of the town:

> The two clubs occupy adjoining sites within the town centre with good access to public transport facilities. They are major spectator sports venues for the town of Chelmsford and, in the case of the Cricket Club, for the County of Essex. The Council will resist development proposals which do not ensure the continued existence of cricket and football at the New Writtle Street car park.
>
> (Chelmsford Borough Council 1997: 90–91)

Therefore, CBC intended to provide support to retain and improve these facilities and to resist any future development on these recreational sites.

6.2.2 Development on recreational facilities near the cricket ground

Even though CBC had included this policy in the Local Plan, the football club had to leave their ground soon after its publication and the football facilities on that site were lost. The football club had been based on a site adjacent to the river Can and next to the cricket ground since 1938. However, the football club fell into financial difficulties and they could no longer afford to maintain the facilities, causing Essex County Council to revoke the permit to use the spectator facilities in 1997 due to safety concerns. The receivers appointed by the mortgagees required vacant possession and the club therefore left the ground in that same year (Chelmsford City Football Club 2000). The land was sold to a developer who submitted a planning application to build, amongst other facilities, a health and fitness centre and 43 dwellings. CBC refused planning permission on the grounds that the site was identified as a recreation area in the Local Plan, causing the proposal to be contrary to policies aimed at retaining the football club's facilities (Chelmsford Borough Council 1998).

The applicants appealed this decision and a public enquiry was held. The inspector concluded that there was no reasonable prospect that the football club would return to the ground, as it would not be viable. Development was considered more beneficial to the area than refusal and the grant of planning permission was recommended. However, the council had concerns that approval of the application would make it more difficult to resist development on other recreational grounds and in particular on the cricket ground, but the inspector found that there were no firm proposals for relocation at that moment in time as the grounds were still in active use. Any proposal in the future would have to go through the same process of weighing local policies and wider merits (Rowlands 1999). As a result, the application was approved, the football ground was developed and the club was relocated outside the centre of Chelmsford.

Not long after, in 2000, a planning application was received to develop the bowling greens: a 0.6 hectare site on the banks of the river Can, adjacent to and west of the former football ground. It was decided by the planning committee to allow residential development in spite of its policy on maintaining recreational and sport facilities in the centre, as long as the bowls club could be relocated in the north of the town. The bowls site was at risk of flooding, but the EA indicated that the site was protected by the existing flood defence scheme to the 1-in-100-years standard (Chelmsford Borough Council 2002). Planning permission for relocation of the club was granted and the development, entailing 60 flats, was completed in 2004 (Hall 2008).

Figure 24: Map of Chelmsford with the location of the cricket ground
Source: Find 2013

In October 2000 and October 2001, open space, gardens, roads and commercial properties were flooded in Chelmsford. The 2000 floods were the result of a very wet autumn, causing high water levels in the river Can in particular. The 2001 flooding was

caused by rainfall, creating high water levels in the river Chelmer. In the centre, properties escaped being flooded when the river flowed only 100mm below the tops of the banks. However, the Rivermead industrial estate flooded and in the wider area of North Essex over 700 properties were affected (Halcrow Group 2007, Scott Wilson 2008, Environment Agency 2009f).

Following these flooding events, the EA initiated more research into flood risk to identify the current standard of protection and the potential to improve these standards. Their report was published in 2006, which showed that flood risk was greater than previously thought. In Chelmsford, 375 residential properties and 86 commercial properties were deemed at risk of flooding with a 1-in-100-years probability. The floods of 2000 and 2001, which were initially thought to be 1-in-200-years events, were found to have a return period of between 20 and 50 years. Areas within the town centre were discovered to have a standard of protection lower than the recommended[44] range of 1 in 50 to 1 in 200 years for intensively developed urban areas. Some sites proved to be at a 1-in-25-years risk of flooding, including the residential development at the former bowling greens that were previously thought to have a 1-in-100-years chance of flooding. The report pointed out that it was important for Chelmsford to have an adequate standard of protection of at least 1 in 100 years. Various flood alleviation alternatives were investigated and the recommendation was made to develop a flood storage area upstream on the river Wid (Black and Veatch 2006, Environment Agency 2006).

This report was followed by a SFRA for the local councils in the Mid Essex area (Scott Wilson 2007), including a town-specific assessment for Chelmsford (Scott Wilson 2008). The SFRA described the main sources of flood risk in the area and the flood defences in the town centre. It stated that the flood defence had a protection level up to 1 in 20 years for the areas upstream of the confluence of the rivers Can and Chelmer, whilst the standard of protection downstream of this point was 1 in 10 years. It recognised that there were areas of functional floodplain within the town centre, some of which were developed, for instance as car parks. It stated that CBC's policy was in line with PPS25 and that they would only permit water-compatible or essential infrastructure for flood zone 3b (which is functional floodplain).

[44] By Defra.

In the meantime, the CBC planned to create a new Local Plan for the years 2001–2011 and published a draft Local Plan. This draft was withdrawn in 2003 in order to commence the preparation of an LDF in accordance with new planning regulations. The Core Strategy of the LDF was adopted in February 2008 (Chelmsford Borough Council 2008i). The Core Strategy continued to emphasise the importance of sport and recreational facilities for Chelmsford. It promoted the enhancement of facilities to further develop Chelmsford's role as a centre for arts, culture, sport and entertainment and aimed to stimulate the growth of sports clubs, including the cricket club (Chelmsford Borough Council 2008e).

In addition, development was concentrated in existing built-up areas, such as regeneration areas in the town centre. Developing these sites was deemed crucial for the long-term sustainability of the town centre; however, many of these were located in flood zones. Therefore, new and existing development in the town centre had to be further protected from flooding. As on-site storage was not possible or viable on these sites, flood defence measures upstream in the rivers Can and Wid were necessary to ensure a 1-in-100-years standard of protection (Broyd 2008). In order to partially fund these measures, planning contributions from developments permitted in the town centre would be requested (Chelmsford Borough Council 2008e). In the meantime, if sites were to be put forward before the measures had been implemented, mitigation would be necessary and CBC would work closely with the EA to consider proposals (Chelmsford Borough Council 2008i).

The strategy also included a policy on green wedges, which were areas of open space along rivers. These areas were situated on the shallow river valleys, which had mostly remained free from development (Hall 2008), as they were used to store water in times of flood. Therefore, CBC resisted development in these green wedges (Chelmsford Borough Council 2008i).

6.2.3 First plans for the cricket ground development

Around the time the Local Plan was published in the late 1990s, a major urban extension was built at the north-east boundary of Chelmsford (Hall 2008). The developers had an s106 agreement with the council that included the provision of sports facilities and they approached the cricket club to ask if they would be willing to relocate their cricket ground at the developers' expense. The cricket club were interested,

because they wanted to improve their facilities and had started designing outline drawings for the new ground, but then found that the council did not want them to leave the town centre. The cricket club claimed that:

> At the time they [the council] became extremely obstructive and imposed a little known planning constraint on us called green wedge policy. Basically it meant that they considered us to be part of the green continuum along the river with the park opposite. But that effectively sterilised this development, which meant that we could not sell this ground and we could not assist with any of the reconstruction at an alternative ground.
>
> (Cricket Club Manager 2012, interview)

The cricket club objected to being included in the green wedge and hired a planning consultant to support them (Consultant A 2012, interview). After two years, the council decided to not apply the green wedge designation to the cricket ground (Cricket Club Manager 2012, interview). This new stance was signalled first in a planning brief for development on the cricket ground, and later the LDF explicitly excluded the cricket ground from the green wedge policy.[45]

Even though the interaction between the cricket club and CBC had been conflicted, it became the beginning of continuing discussions between the two parties about development of the cricket ground. In particular, the change of administration in the council in 2002 improved their relationship:

> The chief executive and chairman of the council changed and the approach and the attitude toward us completely changed as well. They were very understanding of our needs to develop and we started a sensible dialogue with them. They remained pretty adamant they wanted us to stay in the centre of town, but they confirmed they would work with us to make sure we would have everything we needed.
>
> (Cricket Club Manager 2012, interview)

In the meantime, the cricket club's need to improve their facilities grew further. Firstly, the facilities had become old and 'very tired' (Cricket Club Manager 2012, interview), whilst security was not sufficient.[46] In addition, the current facilities did not comply with the Disability Discrimination Act 1995, as they were not accessible to wheelchair users and lacked changing facilities for females and under-18s. The cricket club's governing body, the England and Wales Cricket Board, created new guidelines with which the club had to comply. It became designated as a Regional Centre of Excellence,

[45] This will be discussed in later sections.
[46] For instance, on the night before the interview there had been a break-in.

which meant that the club were expected to upgrade and extend their training facilities. To enable this, the cricket board stated that they supported any residential development at the regional centres (England and Wales Cricket Board n.d.). The cricket club was granted a period of time to achieve the standard, but renovation had to be carried out eventually. Finally, the club also wished to expand their conference facilities to be able to use the grounds on the days without games (Chelmsford Borough Council 2009e, Cricket Club Manager 2012, interview).

Therefore, the club had multiple reasons for upgrading their facilities, but had to develop residential dwellings to fund this. In 2003, they created a master plan outline with 'quite modest accommodation' (Cricket Club Manager 2012, interview). However, there were a number of constraints, as it was a small and constricted site. Architects working on the plans realised early on that an adjacent council car park was needed to develop the site. In addition, the river Can caused a flood risk. Therefore, in the early stages of development flood risk consultants carried out a flood risk appraisal.

In addition, the cricket club had early discussions with CBC over the possibility of redeveloping the area. It became apparent that the council wanted the cricket ground to stay in the town centre. The cricket club on their part informed the council that if they could not develop they would have to move away (Consultant A 2012, interview). Therefore, CBC decided they would work together towards development, even though the cricket ground was in an area at significant risk of flooding and the inclusion of a council car park was required.

6.2.4 Planning brief for the cricket ground development

To support the redevelopment of the cricket ground and communicate the council's support, a planning brief was published in 2004 (Chelmsford Borough Council 2004). At the time, the planning brief had status as Supplementary Planning Guidance, which was later revoked when it was absorbed into the Core Strategy and Development Plan Documents. The planning brief stated that the cricket club needed to generate capital from commercial development, in order to expand their facilities and achieve long-term financial stability. The council claimed that retention of the cricket club was crucial for the town centre's variety and vitality. Therefore, CBC decided to:

> positively support radical change and development of the County Ground to achieve a viable, national-standard cricket centre [and] support appropriate development that will help finance the Cricket Ground.
>
> (Chelmsford Borough Council 2004: 3)

Apart from renewing cricket facilities and increasing seating capacity from 5,000 to 8,000, a cricket school, restaurant, bar and improved parking facilities were planned at a cost of £10 million. Residential dwellings on the riverbank would generate the funds needed. The plan was to build dwellings that were similar to the development on the former bowling greens, which comprised four-storey apartments with undercroft parking facing the river. The cricket club redevelopment also included the use of a public car park owned by the council to create sufficient space for commercial development.

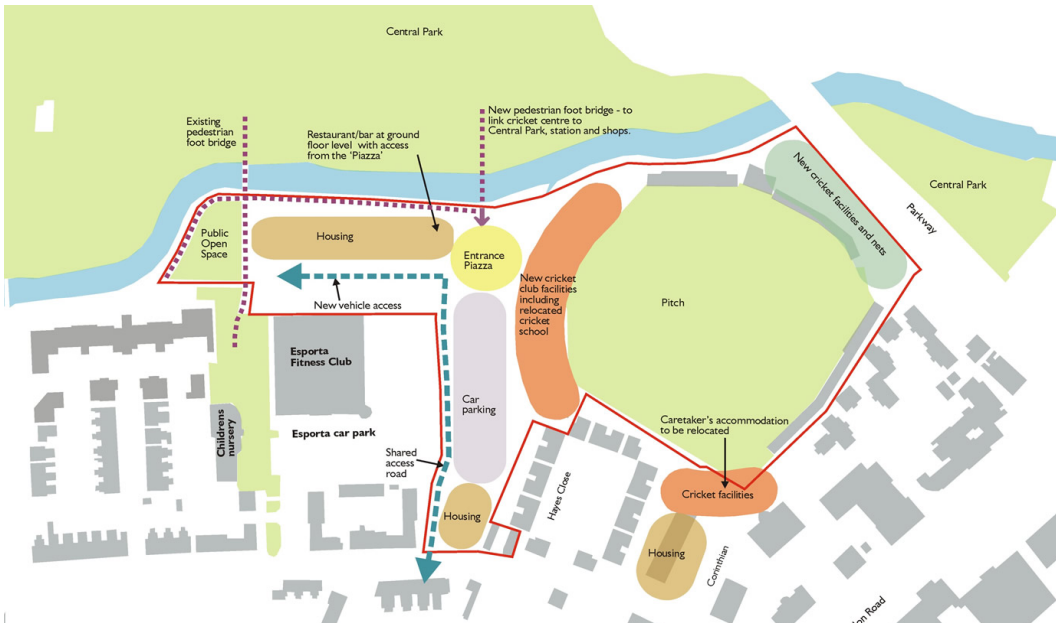

Figure 25: Concept plan for cricket ground redevelopment

Source: Chelmsford Borough Council 2004: 31

The planning brief also stated that the majority of the site was within the river Can's floodplain and was not protected against flooding, unlike the development on the former bowling greens. It was possible for the cricket pitch to flood via routes under the stand and future development would have to take this into account. Residential development would not be able to have ground level accommodation and it was suggested to include an undercroft car park to create flood capacity. However, even though the site had a large flood risk issue, CBC found that there was no other land viable for a spectator sports centre that had less flood risk. The EA, on the other hand, highlighted the unsuitability of the site for housing due to flood risk (Environment Agency 2009b).

After the planning brief was published, the cricket club started to select a development partner with the help of the planning consultant who had assisted them in the objection to the green wedge designation. The chosen developers selected a new flood risk consultant to continue work on the flood risk issues on site (Consultant A 2012, interview).

6.2.5 Inclusion of the cricket ground in the Town Centre Area Action Plan

In August 2008, the Chelmsford Town Centre Area Action Plan (AAP) was published to guide development in the town centre (Chelmsford Borough Council 2008b). The AAP included a strategy to promote sport and leisure within the town centre and to improve facilities at two major schemes, one of which was the cricket club. The cricket club was described as a 'major sporting asset deserving a higher profile in the town' (Chelmsford Borough Council 2008b: 21). It also designated a green wedge area within the town centre along the river, but with two exception sites. One of these was the cricket ground, which meant that development on this site took precedence over the green wedge designation (Chelmsford Borough Council 2008c).

The plan incorporated the new data from the EA's flood risk study (Environment Agency 2006), which increased flood risk figures for the town centre. In total, 20 of the 37 sites allocated in the AAP were wholly or partly within flood zones 2 and 3, including the cricket ground. At first, the AAP did not include sequential and exception tests for the sites at risk of flooding. However, after the EA indicated the AAP needed to conform to the draft of PPS25, these two tests were later performed (Chelmsford Borough Council 2006, Environment Agency 2009b). The sequential and exception tests for the cricket ground showed that both the council and the club wished to remain on that site and they considered it a sustainable location (Chelmsford Borough Council 2009d). As the club did not own any other land, they had to develop on that site to raise finances to improve their current facilities. Two alternative sites were considered, but dismissed as they were either too remote or had too many constraints.

The flood risk issues with the cricket ground were also discussed. Both the ground and the council's car park were located in a 1-in-20-years flood risk zone. The tests acknowledged that the uses that were planned here were inappropriate within the flood risk zone and should not normally be permitted there (Environment Agency 2009b). The tests recommended the building of a raised defence if development were to take

place, but the site would still have a high level of residual risk[47] (Chelmsford Borough Council 2008c). However, the development was considered to be sustainable, due to its location within the town centre and its contribution to revitalising the town (Entec UK 2006). Therefore, as wider sustainability benefits outweighed the flood risk, the site passed the exception test (Chelmsford Borough Council 2007b).

After consultation regarding the AAP, responses were summarised in a document by the council. There were no objections to the plans for the cricket ground, although some responses were that the building heights could be raised and that the residential capacity of the site could be increased (Chelmsford Borough Council 2007a). The EA also did not object to the AAP as the sequential test showed that the estimated number of 100 dwellings were planned outside the functional floodplain (Chelmsford Borough Council 2007b, EA Officer E 2012, interview). They recognised the importance of regeneration in the town centre, but also wanted to ensure the development was in accordance with PPS25 (Environment Agency 2009b). To enable development in the centre, CBC and the EA agreed on a protocol to work together. This protocol was signed in August 2007 and revised in March 2008. It stated that:

> While new development proposals must pay proper regard to flood risk, it would be contrary to the interests of the town to delay formulation of development proposals for key regeneration sites, pending a flood alleviation scheme. The Environment Agency and Chelmsford Borough Council therefore jointly wish to ensure planning permissions address the anticipated flood risks of the location before and after the alleviation scheme is completed and help to generate funding for the alleviation project.
>
> (Chelmsford Borough Council 2008g: 11)

For developments that were completed before the flood alleviation scheme, CBC and the EA required a contribution. For developments to be completed after the scheme, they allowed flood risk levels to be based on the post-construction situation (Chelmsford Borough Council 2008d, Chelmsford Borough Council and Environment Agency 2008). Furthermore, the council and the EA would cooperate with developers to ensure 'a satisfactory working relationship to bring forward development on town centre sites in Flood Zones 2 and 3' (Chelmsford Borough Council 2008g: 6) and the EA would discuss objections to development proposals with the council in order to avoid applications being called in and to prevent delays to regeneration plans.

[47] Residual risk is the probability and consequence of breaching or overtopping of a raised defence, the ease of providing safe pedestrian egress, the flood hazard rating based on depth and velocity and the impact of mitigation on flood risk upstream or downstream (Chelmsford Borough Council 2008e).

In the AAP, the residential development that was planned in order to finance the cricket ground redevelopment had an estimated capacity of 100 dwellings and was limited to a building height of three to five storeys. This capacity was derived from the Urban Capacity Study of 2007. This study had identified the ground as a potential residential site with an estimated capacity of 80 dwellings (Halcrow Group 2007), but this was then increased to 100 for the AAP. However, in March 2008, the residential capacity for the cricket ground was raised again through a new policy document that covered the council's vision on housing (Chelmsford Borough Council 2008a). The cricket ground was described as:

> a unique opportunity to improve the existing facilities whilst also enabling new facilities to be provided at the site. This will include new sport facilities and approximately 300 new homes at a location close to the town centre.
>
> (Chelmsford Borough Council 2008a: 23)

One of the drivers behind increasing the number of residential dwelling on site was development pressure. The cricket club had become one of seven key sites in the policy document, which were designated to help to contribute 7,200 new homes between 2008 and 2021 as part of regional growth targets. As a result, the cricket ground's capacity was trebled.

In the meantime, knowledge of flood risk continued to develop. In 2009, the EA produced a Catchment Flood Management Plan (CFMP) for North Essex (Environment Agency 2009f). This CFMP covered the catchment area of four major rivers: the Chelmer, Blackwater, Colne and Stour. This area covered four urban settlements: Chelmsford, Colchester, Braintree and Sudbury. It was estimated that in Chelmsford, 366 properties – representing 692 people – had a 1-in-100-years probability of flooding. The plan predicted that this flood risk would worsen in the future. If there was a 10% increase in urban area and a 20% increase in peak flow in all watercourses due to climate change, but flood defences remained the same, then by the year 2100 a total of 649 properties – representing 1,187 people – would be at risk of flooding. The plan also claimed that the embankments of the river Can provided protection from a 1-in-10-years to a 1-in-50-years probability.

6.2.6 Planning application for cricket ground development

In the second half of 2007 and approximately 12 months before the application was submitted, pre-application discussions took place between the planning department and the applicants, in which they went through various designs (Developer B 2012, interview). Flood risk consultants working for the developer requested data from the EA to calculate flood risk on site (EA Officer D 2012, interview). Flood risk was also discussed directly between principal parties, for instance in a meeting in May 2008 between the council, the EA, the architect and the flood risk consultants. The council confirmed that their current stance was to fully support redevelopment of the site. The EA pointed out that they would not agree to development within the functional floodplain (flood zone 3b) and there were discussions on overcoming the issue of developing in a functional floodplain. The consultants suggested reviewing the hydraulic modelling to see if flood levels might be lowered. The council suggested redefining the functional floodplain within the council's SFRA or starting discussions with DCLG to argue that the development was an exceptional case (Environment Agency 2009b).

In the meantime, the cricket club and developers were keen to have the application ready for the summer of 2008, so that there would be minimum disruption to the cricket club. As a result, the application was submitted in July 2008 (Chelmsford Borough Council 2008f, 2008h). The application proposed to demolish existing buildings and redevelop the cricket ground and the council's car park[48] in order to provide:

- A new cricket pavilion, cricket centre and stands with a capacity of 8,000 spectators and with ancillary catering, retail and office functions, new media centre, floodlighting and groundsman's facilities;
- A multi-storey car park with 307 spaces;
- 1,800 m^2 for retail (A1) and catering (A3/A4) uses;
- 426 residential units, comprising 302 flats in three blocks with undercroft parking at the riverside, 109 flats to the east and 15 units of town houses with flats at the site entrance to the south;
- A public piazza and a new footbridge over the river (Chelmsford Borough Council 2008f).

[48] See Figure 26 and Appendix N for photographs of the development site.

Three blocks of flats of 8, 12 and 19 storeys situated on the riverbank formed the major part of the residential development. Flood risk was calculated using a revised model developed by the flood risk consultants. In addition, they added the benefits of the future flood alleviation scheme into their calculations. To address flood risk issues, habitable floor levels were raised above the 1-in-100-years modelled flood level with an allowance for climate change. Additionally, flood storage was provided by an undercroft parking area and other storage areas. A SuDS-based surface water drainage scheme was provided as well, including underground storage attenuation tanks and infiltration systems. Furthermore, the s106 agreement included a contribution of £500,000 by the applicants towards flood defence measures, which was offset by a lower allowance for affordable housing and lower highway contributions (Chelmsford Borough Council 2009a, Cushman and Wakefield 2008b, 2009b).

Figure 26: Development site for residential dwellings at the cricket ground
Source: Author 2012

After submission, the EA responded formally to the planning application in a letter dated August 2008 (Environment Agency 2008). The first issue they raised was that the application conflicted with the town centre AAP. The application did not reflect the true aspirations of the site allocation, which had an estimated capacity of 100 dwellings, significantly fewer than the 426 dwellings applied for. As a result, dwellings were now planned in the functional floodplain. They also objected in principle to locating development in flood zone 3b, as it was not compliant with PPS25. In addition, they did

not agree with the future flood alleviation scheme being used to lower flood risk on the site, because according to the EA the site would still be partially flooded in a 1-in-20-years event. Lastly, there were some issues with technical aspects of the FRA, such as the need for higher floor levels, the safety of the undercroft parking, the ability of floodwater to flow back into the river and the need for a detailed flood evacuation plan (Environment Agency 2009b).

In addition, the EA raised issues with the FRA, in which consultants had developed a flood risk model, resulting in a flood risk that was lower than the EA's model. The consultants replied that they applied their own modelling because they found that the EA's models lacked detail; therefore, the consultants argued they improved it:

> We take their coarse model and then refine it, so it is better for our local purposes. Because their model is coarse it is often conservative; it exaggerates the reality. When we refine it, knock out the various assumptions that go into their model and replace those assumptions with facts, we end up with the flood level coming down.
>
> (Consultant B 2012, interview)

The EA did not accept the consultants' revised model and felt it did not reflect reality. It excluded historical flood events from 1947 and 1958, resulting in a lower flood risk and a smaller functional floodplain that was outside the built environment (Environment Agency 2009h). The EA also did not agree with other methods to calculate flood risk; for instance, the current volume of flood storage was underestimated, because buildings that allowed water to flow through were seen as solid structures (Environment Agency 2009g). One EA officer believed that:

> The consultants who they [the developers] had appointed clearly had a brief to deliver something regardless of how they did it … They were obviously trying to get an answer for the site in terms of the flood risk by coming up with an approach to hydrology to give them the answer they wanted.
>
> (EA Officer C 2012, interview)

Another EA officer felt the consultants were trying to carry out a deception, with the EA constantly trying to uncover it:

> My opinion was that they were trying to achieve their own goals. In a way – maybe it is a bit of a strong word – they were trying to cheat to do that.
>
> (EA Officer D 2012, interview)

The consultants believed that the EA was reluctant to change their modelling, because it meant that flood levels used to design the flood alleviation scheme in Chelmsford were wrong. If flood risk was lower than expected, the cost-benefit analysis for implementing the scheme would be affected (Consultant B 2012, interview). The EA, on the other hand, stated that the flood levels on and off site were, in reality, higher than the consultants suggested, and not enough floodplain compensation was provided for (Environment Agency 2009a). However, the EA decided to review their own data to check if their flood risk levels were right. As a result, the EA revised the flood risk, and their flow levels were slightly lower than before, but still not as low as the consultants' levels (Environment Agency 2009h).

The consultants also argued that the development area should not be defined as flood zone 3b, because, technically, it was not a functional floodplain. Their interpretation of PPS25 was that functional floodplain had to be a natural, undeveloped corridor, never an already developed area (Consultant B 2012, interview). As the site was within an existing developed area the site should not be classified as a functional floodplain (PBA 2009) and development would not be prohibited by PPS25. The EA disagreed and argued that PPS25 does not differentiate between developed and undeveloped areas.

Furthermore, the developers' emergency plan assumed there would be a flood warning 24 hours in advance, but the EA argued they could only provide two to four hours advance warning. The car park would suffer potential water depths of 1.7 metres in a 1-in-100-years flood event, taking into account the possible effects of climate change, which could cause unsafe situations if people tried to move their cars. The EA acknowledged that the car park would be closed during flooding and could not be accessed, but they were concerned about people bypassing this system. In addition, the EA had other concerns over the loss of floodplain that was not compensated level for level on site, which might affect flood levels on and off site.

Lastly, the EA also objected to the applicants' use of the sequential test as performed in the AAP. In an interview, one of the EA officers said that during pre-application meetings the consultants were still indicating that 100 dwellings were going to be built, but when the application was submitted they found out that the number of dwellings had been increased to over 400 (EA Officer E 2012, interview). Therefore, the sequential test was no longer relevant and further work should be undertaken to identify the amount of residential development within flood zones.

In response to feedback given by the EA, the flood risk consultants revised the FRA four times (EA Officer D 2012, interview). According to the EA, the consultants suggested a compromise, which entailed that the consultants would adopt the 1-in-100-years flood levels from the EA model if the EA were to adopt the 1-in-20-years flood levels from the consultants' model. The EA declined to do so, claiming there was no logical reason to use results from two different models (Environment Agency 2009h). Therefore, the EA did not accept the consultants' FRA.

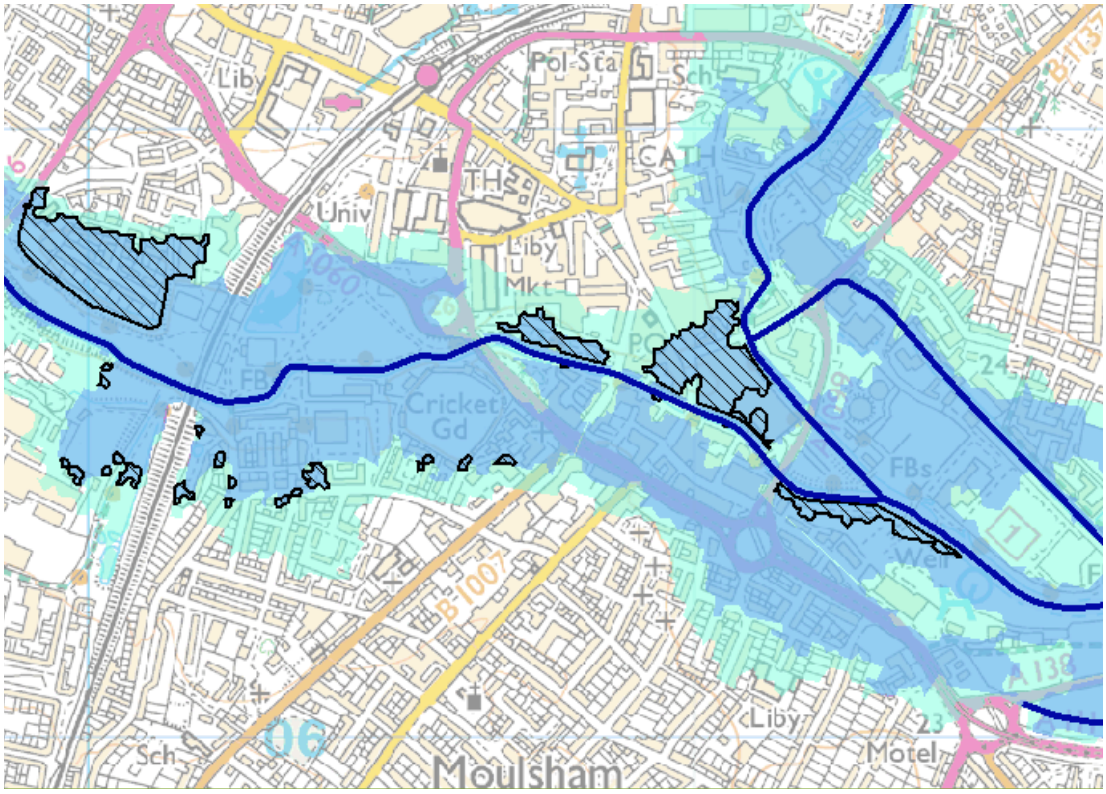

Figure 27: Flood risk in Chelmsford, including the cricket ground
Source: Environment Agency 2013

In the meantime, local residents had become involved in the planning process. They decided to object to the planning application, mainly because they thought the development would cause overlooking and too much traffic. They reported not to be against the development in principle, but felt the site was being overdeveloped and was causing harm. In addition, there were some concerns that the site was within a floodplain and should not be developed on (Local Residents' Group 2009f, 2009h). In total, CBC received 29 letters of objection and a petition with 33 signatures (Chelmsford Borough Council 2008g).

6.2.7 Discussion of the cricket ground development in planning committee

The applicants were keen to have the application discussed as soon as possible in the planning committee, stating that a delay would be likely to jeopardise the project. The cricket club wanted the preliminary works to commence in January 2009 to enable a timely return to the ground. As the EA had not given a final response it would not be possible to achieve resolution on flood risk issues, but it was decided to put the application before the committee to discuss all other issues, whilst keeping flood risk issues for a later date (Planning Officer C 2012, interview).

Figure 28: Artist's impression of cricket ground development
Copyright: MCD
Source: MCD and ECCC 2012: 1

The application was examined in committee on 30 September 2008 (Chelmsford Borough Council 2008g). The committee noted that the application would achieve an important council objective by retaining the sporting venue in the centre, whilst enabling the cricket club to upgrade their facilities. A local ward member expressed his concerns about issues of overlooking, but the committee felt the relationship between the development and existing properties was acceptable. The committee concluded that they were minded to grant the application permission, subject to the EA's objection being withdrawn.

However, the EA did not withdraw their objection in their final response and the application was put forward to the committee again in January 2009 (Chelmsford Borough Council 2009c). The EA indicated that if the committee was minded to recommend the development, it would have to be referred to the SoS in accordance with the requirements of the Flooding Direction. The committee commented that the EA's objection was one made in principle, which would be sustained even if the EA accepted the developer's latest FRA. The committee also felt that the development met sustainable planning criteria in terms of location and travel patterns, intensification of town centres and provision of public facilities. The committee voted on the application, but as there was no majority for approval or refusal, the chair used his casting vote and decided to recommend the application for approval (Local Residents' Group 2009e). The reason provided was that:

> Given the wider importance of the development and that it is designed to maintain the function of the floodplain, water flows are not impeded, flood risk is not materially increased elsewhere and the occupiers should be safe for the lifetime of the development, it is considered that these factors outweigh the in principle concerns of the Environment Agency and the development is acceptable.
>
> (Chelmsford Borough Council 2008g: 26)

As a result, the application was referred to the Government Office for the East of England, which decided the application should be referred to the SoS (Cushman and Wakefield 2009a).

6.2.8 Discussion of the cricket ground development in the public inquiry

The SoS decided to call in the application and hold a public inquiry in July and August 2009. To be discussed were the accordance of the development with the development plan, the quality of design, whether it was consistent with PPS3 (housing), PPS6 (planning for town centres), PPS9 (biodiversity and geological conservation), PPS25 (flood risk), planning conditions and the s106 agreement (Cushman and Wakefield 2009b, Lyon 2009a).

To try to resolve any issues before the inquiry, regular meetings took place between the EA, the applicants and the council (Chelmsford Borough Council and Cushman and Wakefield 2009, EA Officer D 2012, interview). These parties also set out Statements of Common Ground. The EA and the council agreed that part of the site was within functional floodplain, but the applicants sustained their argument that it was not (Flood

Risk Consultant for Chelmsford Borough Council 2009). However, the council indicated that they supported the development plans and disagreed with the EA's objection to the sequential and exception tests and the adequacy of the FRA, but agreed on finished floor levels, access and egress, river flows and ecology. In addition, no agreement was reached on flood storage issues and whether the FRA was adequate and appropriate (ECCC et al. 2009, Scott Wilson 2009). The residents disagreed with the cricket club and the council on the density and appropriateness of the proposal, design, effects on residential amenities and traffic, appropriateness of the s106 scheme and viability of the scheme (Lyon 2009b). There were no other planning issues between the parties (Cushman and Wakefield 2009a).

The applicants' architect, planning officers and local residents – the last of which were concerned with issues of overlooking – also held regular meetings. As a result, the applicants adapted their plans by reducing one of the blocks close to existing properties from three storeys to two storeys. The position was also changed by one metre and the number of units was reduced from eight to five, making the total number of residential units on the whole development 424 (MCD 2008, Chelmsford Borough Council 2009e, 2009f). The inquiry that took place was based on these revised plans.

A few months before the inquiry, in February 2009, severe flood warnings were issued for the centre of Chelmsford and the rivers Chelmer and Can overflowed (Environment Agency 2009b). The apartments that were built on the former bowling greens suffered a power cut because of rising water, which also meant that there was no water supply. The area where the new development was planned partially flooded as well (Figure 29). This event was estimated by the EA as being a 1-in-12-years event (Scott Wilson 2009).

During the inquiry, the EA reiterated their main concerns. They claimed the sequential test performed for the AAP was not valid anymore, as it was based on 100 dwellings as opposed to over 400. The EA argued that they could not have reasonably expected the development to grow by over 300 dwellings, which meant their previous approval of the sequential testing for the site in the AAP was retracted. The sequential test should be failed, whilst, in accordance with PPS25, the exception test could not be applied to residential development in flood zone 3b. Moreover, the EA accepted that the council was entitled to take other material considerations into account to decide on development, but did not accept they could be used to override PPS25. Furthermore, the EA believed the FRA was inadequate and difficult to understand:

> Its piecemeal presentation has impacted on the ability of the EA and others to interpret it, which affects its intelligibility. Different assumptions have been made at different times and for different purposes and it has not always been possible to tell exactly what has been taken into account because of the way in which the data has been presented. In particular, criticism is levelled at the flood storage compensation proposals and the information relating to flood storage calculations.
>
> (Lyon 2009b: 10)

Figure 29: Flooding on cricket ground development site

Source: Local Residents' Group 2009c, 2009d

According to the EA, the development also did not provide adequate flood storage and increased flood risk at a number of existing residential properties. In addition, the FRA had adopted the EA's flood levels and flows without adopting the most up-to-date LiDAR ground level data, resulting in a slightly raised ground level that was incorrect (Environment Agency 2008). Lastly, the EA believed the development would increase flood risk. The car park would be expected to flood at a 1-in-12-years event, which might cause dangerous situations if people tried to rescue their cars:

> All allocated car park areas for the residents' vehicles, including the multi storey car park, will become 'unsafe' for all events from the 1 in 50 year to the 1 in 100 year fluvial events inclusive of climate change. They will be highly hazardous areas in flood risk terms for residents and operatives as they will be covered by deep depths of floodwater (up to 2m) and have floating vehicles.
>
> (Environment Agency 2009b: 4)

Residents were also present at the inquiry to present their case under Rule 6 of the Town and Country Planning (Inquiries Procedure) (England) Rules 2000. A Local Residents' Group (LRG) was formed 'by a group of local residents who live in a range of residential properties close to the Cricket Club and who will be directly affected by the proposed development' (Local Residents' Group 2009f). The LRG was a well-organised group: one of the residents had a developing and planning background, whilst

a barrister also helped them for part of the inquiry (LRG A 2012, interview; LRG B 2012, interview). The residents mainly wanted to raise the issues of overlooking and noise, but also used the flood risk issue to strengthen their objection (*Essex Chronicle* 2009, Local Residents' Group 2009a, 2009g).

For flood risk evidence, the residents mostly relied on the EA, as they lacked the expertise. They did relay personal experience with flooding to highlight the problems a new development would cause. One of the residents who lived in the apartments on the former bowling greens gave a statement on how the recent flooding had affected the inhabitants of the flats. They stated they were not given enough notice in order to prepare for a flood:

> Amongst the disruption there was also confusion. The night before the flooding we went outside in the rain to look at our river and it was rising. We looked at the Environment Agency website and it said 'flood watch'. That's reassuring, the lowest level of alert. I'm told it changed at 3am, but I was asleep. I got up at 6am – the river had burst its banks.
>
> (Local Residents' Group 2009f: 4)

When contacting the council to request sandbags, they heard there were none left. The floodwaters caused the power supply to fail and they were left without power and water for several days. Elderly residents could not leave their apartments as the lifts were out of order and were brought bottled water by neighbours instead (Local Residents' Group 2009f). The residents had to pay to reinstate the electricity. This experience caused the LRG to conclude:

> Future flooding depends on many things. The emergency services and the council were tested in February and were unable to cope with the existing population. Building large blocks of flats in an already densely populated area will make flooding more severe and more frequent. This makes awful become appalling, horrific and frankly inexcusable.
>
> (Local Residents' Group 2009f: 4)

At the inquiry the LRG also stated they were unhappy with the planning process. They felt that the scheme was rushed into the planning committee and some issues were unresolved when it was presented to the councillors. Furthermore, they felt that residents and a councillor opposing the scheme were not granted enough time to present their views. To overcome this, the residents had prepared one long statement which was divided between residents, with every person using their speaking time to deliver their allocated part of the same speech (LRG A 2012, interview; LRG B 2012, interview). Furthermore, one of the residents reported hearing a conversation between a councillor

and a planning officer, with the councillor mentioning that it had already been decided that the development would go ahead (Local Residents' Group 2009h). They felt that planning officers had not been allowed to delay the referral to the committee or to be objective when assessing the development's compliance with local policy (Local Residents' Group 2009f). The LRG's conclusion was that the council's desire to retain the cricket club in the centre of the town had clouded judgement, whilst the cricket club was overdeveloping the site:

> Greed has motivated the Cricket Ground to wish to build so many homes on this site. The number of homes proposed should be reduced or removed from the scheme altogether, to take account of the impact of the risk of flooding on people's lives.
>
> (Local Residents' Group 2009b: 1)

When CBC gave their statement, they claimed that the sequential test in the AAP had concluded that development would not normally be permitted in flood zone 3b. The word 'normally' recognised the fact that there may be special circumstances under which development would be allowed. The special circumstances were that the redevelopment would contribute to 'an urban renaissance for Chelmsford' (Lyon 2009b: 17). The council also believed that when an estimated capacity for a site is given, it is common for sites to gain permission for substantially more development. Therefore, they supported the development.

The cricket club also believed that the AAP allowed development in flood zone 3b in special circumstances. They claimed that without this development the cricket club would: 'wither on the vine; but with this development, there would be an increase of over 50% in expenditure in the local economy and an increase in jobs of nearly 50%' (Lyon 2009b: 34). If they were only allowed to build outside flood zone 3b, they could only develop 127 units, which would not produce sufficient value. Nevertheless, the cricket club and consultants stated that the site did not in fact contain any functional floodplain. They argued that a functional floodplain in PPS25 comprised land where water had to flow or be stored in times of flood. In their case, the floodplain was only a localised low spot where the water had no flow and that could easily be relocated (Flood Risk Consultant for Chelmsford Borough Council 2009, Lyon 2009b, Consultant B 2012, interview).

The club then went into very detailed discussions on the sequential test and the flood risk calculations; for instance, how they felt they had used more accurate data than

LiDAR. They also claimed that even though the site had flooded a few months before, the flood water was shallow and slow flowing and would be manageable in the new development within the car parks (Scott Wilson 2009).

After the parties made their case, the inspector concluded that it was not realistic to accept that an indicative capacity of 100 dwellings could include the figure of 424. This indicative capacity was the reason that the EA had originally withdrawn its objection to the AAP. Therefore, the inspector concluded that the application was in conflict with the town centre AAP in regard to the quantum of the residential element. The site also failed the sequential test and was therefore in conflict with the AAP in regard to its location within flood zone 3b.

Furthermore, the inspector found that the site was partly within flood zone 3b, or functional floodplain, because it had a 1-in-20-years probability of flooding. With regard to the FRA, the inspector concluded that it was:

> presented in a form that required close examination and interpretation, including making a judgement on volumes from the areas shown on plan. Whilst the information is provided in a form that is not always easy to command, I do believe that sufficient information is present to render FRA an acceptable Flood Risk Assessment.
>
> (Lyon 2009b: 47)

The levels given by the FRA differed only slightly from the EA and had a minor effect on potential impacts, which were compensated by the additional flood storage. Additionally, the development did not materially affect the flood risk to existing properties. Therefore, the inspector believed the FRA was sufficient and the development took flood risk into account sufficiently. Lastly, the inspector disagreed with the EA that flood risk outweighed other interests:

> My understanding of the EA case as it is put is that PPS25 considerations 'trump' any other considerations; if anything fails the tests in PPS25, there is nothing that could outweigh that failure. This must be wrong, as PPS25 is just one strand of Government policy, it is one of the material considerations that may form part of a planning judgment.
>
> (Lyon 2009b: 48)

The inspector therefore argued that the development was crucial to the economic and social state of the cricket club and Chelmsford, which outweighed flood risk considerations:

> Stagnation of the club would not only harm the club but the loss of its potential is likely to harm the vitality of the town centre … Full regeneration of the club and associated benefits would require the project as applied for, or something very close to it.
>
> (Lyon 2009b: 56)

The inspector did find the harm to the amenity of existing residents unacceptable. The distances between new and old buildings were too small, causing overlooking from the new buildings and from lorries and coaches on the new access road. The inspector considered that the proposal had a significantly harmful effect on the living conditions of residents at the entrance of the site by way of loss of privacy, overlooking and noise and disturbance contrary.

In conclusion, the inspector found that the benefits of the scheme outweighed the inconsistency with PPS25 and believed flood risk was taken sufficiently into account into the development. However, he did think the existing scheme would harm the amenity of residents and he therefore recommended refusal.

6.2.9 Decision on the cricket ground development after the public inquiry

After the public inquiry, the application was referred to the SoS. However, his decision was delayed because the government was going through political change and a new SoS was appointed. In addition, the applicants submitted an amended scheme for the SoS to consider and letters were sent to all Rule 6 parties requesting comments. Correspondence followed between the applicants, the planning consultants, the residents, CBC and the SoS. As a result of these discussions, eight houses and five apartments were removed at the entrance of the site (Chelmsford Borough Council 2009b) and the SoS considered the application on this amended scheme.

The SoS agreed that the site was, in part, in flood zone 3b and, therefore, the proposal conflicted with PPS25. The SoS placed significant weight on PPS25 and considered that exceptions to policies on floodplain development would rarely be justified. However, the SoS believed that the application took flood risk and the consequences of flooding into account and the development was adequately defended against flooding. Additionally, the development would bring benefits that outweighed the risk from flooding.

The SoS concluded that the scheme that was considered at the inquiry would have a significantly harmful effect on the living conditions of the residents at the entrance of

the site, but as the amended scheme had removed dwellings and realigned the access road further away from their homes, any remaining harm to the amenity of residents would not be significant enough to refuse planning permission. Therefore, the SoS granted permission for the development that included a total of 413 dwellings, with 302 units on the riverside (Pitt 2010).

In January 2011 and May 2012, Chelmsford was again flooded, affecting open spaces, roads and gardens. In the meantime, work was progressing on the flood alleviation scheme. As described in the water cycle study for Chelmsford (Halcrow Group 2010) new research showed that flood storage would provide protection to the town centre with a 1-in-75-years standard. The preferred option to achieve this was to build flood storage near Margaretting on the river Wid (Environment Agency 2012a). To increase the standard of protection, further works were planned for the future, which might include defences within the town centre, defences north of the town, or a combination of both on the river Chelmer (Halcrow Group 2011).

In 2013, work on the cricket ground development started. In January, an agreement was signed between the council, the cricket club and the developers to start the first phase: the first tower block on the riverside. So far[49], 90% of these flats have been sold, which has generated the funds for the rest of the project, which includes a new media centre, pavilion and improved conferencing facilities (*Brentwood Gazette* 2013, ECCC 2013). The new cricket facilities are expected to be built in 2015 (Cricket Club Manager 2012, interview).

6.3 Summary

The idea to redevelop Chelmsford's cricket ground started when the cricket club wanted to renovate their facilities. From around 2003, the cricket club started meeting with CBC to discuss options for redeveloping the cricket ground. They indicated that they needed funds to redevelop, generated from additional development around the cricket site. The council signalled that they wanted the grounds to remain in the town centre, as they thought the cricket club was vital to Chelmsford. Therefore, they supported development by working towards an approved planning application and by including a council car park into the plans. However, because the cricket ground was adjacent to the

[49] As of March 2013.

river Can and partially within the functional floodplain, development was at risk of flooding.

The redevelopment was first included in a planning brief and later became part of an AAP. At the time, the estimated number of residential dwellings was 100. The EA was consulted on these plans and they required sequential and exception tests to be undertaken to address flood risk issues. As the 100 dwellings would not be located within the functional floodplain, they did not object to the tests.

The cricket club selected a development partner for the site. The agreement was that the cricket club would fund part of the development, but would in turn receive part of the proceeds from the sale of the residential dwellings (ECCC 2013). When the cricket club and developers applied for planning permission, the number of residential dwellings had increased to over 400, with a large proportion of these planned to be within the functional floodplain. Even though the planning committee recommended the application for approval, the EA objected to the principle of building residential accommodation within functional floodplain, based on PPS25.

Due to the Flooding Direction, the application was referred to the SoS, who called in the application and held a public inquiry. In this inquiry, flood risk was discussed, but also issues of the development affecting the amenity of residents. Ultimately, the inspector stated that the benefits of development outweighed the flood risks, which he believed were mitigated sufficiently. However, he found that the development caused harm to the amenity of existing residents and refused the application on these grounds. When the application was referred back to the SoS, the applicants submitted revised plans, which decreased the effects on amenity. The SoS therefore permitted the development, arguing that the social and economic advantages were more important than the principle of building within functional floodplain.

Chapter 7 Network governance in local planning processes

7.1 Introduction

In this chapter, the findings from the cases are discussed and in particular, the functioning of the governance networks is examined. Sections 7.2 and 7.3 apply the theoretical framework (see Figure 30) to the findings of both case studies.

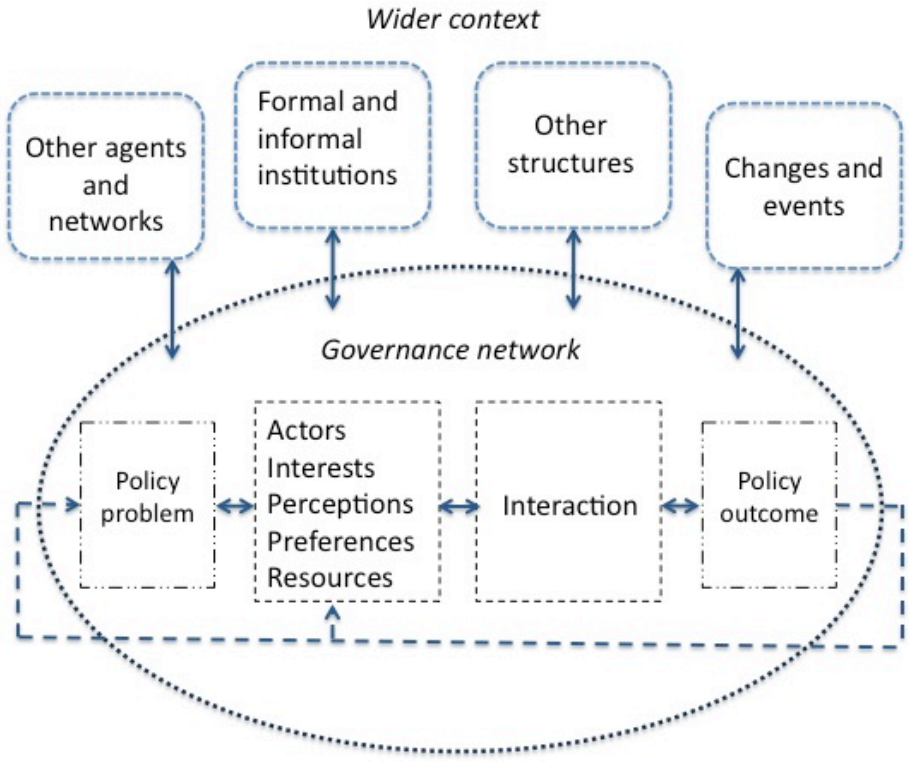

Figure 30: Functioning of governance networks

After this, section 7.4 discusses the key factors that influence FRM. Following this, section 7.5 relates the findings to the wider debate on governance. Lastly, conclusions are drawn.

7.2 Newcastle Great Park

This section discusses the governance network for FRM in Newcastle Great Park. The following elements are included: how the governance network was formed and around what policy problem the network was formed, the actors that were present in the governance network, their characteristics, their interactions with each other and the

interactions between the network and the wider context. The functioning of the governance network is visualised in Figure 31 on page 177.

7.2.1 Formation of the governance network

The governance network of FRM in NGP was formed voluntarily and informally in the 1980s, when there was no legal or policy requirement to do so. The governance network was established firstly between planning officers and the EA to resolve flood risk and drainage issues in the early stages of planning for NGP. In this early stage, the idea to use SuDS as a type of FRM was also formed. Later, other actors became involved, such as the developers and the WaSC. Some of the involvement was mandated, such as the consultation of the airport, but other interactions were voluntary. For instance, the community was more involved than regulations prescribed.

7.2.2 The policy problem

The network was formed around the problem of flood risk. NGP had a fluvial flood risk from the rivers Ouseburn and Letch and a pluvial flood risk from surface water. Moreover, NGP could exacerbate flood risk in surrounding areas. The policy problem was understood in part when the network was formed, due to past experiences with flooding of the Ouseburn and the regular occurrence of surface water flooding in parts of NGP. The EA had also held surveys of flood risk along the river, which helped the identification of the policy problem and the extent of the flood risk.

Knowledge about the exact problem developed over the years as more research was conducted and flood events took place, which provided more information. As a result, the problem definition also continued to develop. For instance, in recent years actors have gained understanding of the potential of NGP to aggravate pluvial flood risk in Kingston Park. This is a new problem that requires the actors to develop new knowledge and new solutions.

Therefore, the policy problem has been influenced by flood events in combination with knowledge developed by the EA. Developing knowledge of the policy problem has in turn influenced the policy outcome, because actors take decisions based on their understanding of the problem. However, the complexity and uncertainty of the problem have also complicated decision making, as changing flood risk meant that solutions had

to be adapted. In addition, there are differences between some of the actors' perceptions of the flood problem, which will be explained in the next section.

7.2.3 Actors, characteristics and interactions

The actors present in the governance networks were in the first instance the planning officers and the EA, joined later by the developers, the WaSC, residents and councillors, the CAA and airport and other organisations that were consulted as part of the planning process. In this section, these actors and their characteristics and interactions are described.

Newcastle City Council, planning officers and engineers: The planning officers' interest was to implement planning policy, such as the UDP, which focused on achieving economic growth, stabilising population numbers and working towards the long-term goal of sustainability without compromising on economic vitality (Newcastle City Council 1998c). To achieve these aims, NGP was planned as an upper-market, sustainable development in green belt land, because it was marketed with the wealthier population in mind, but also to mitigate the use of green belt land. The WaSC officer stated that the emphasis on sustainability was also done to mitigate objections from residents:

> The Great Park met a lot of public objection. There was a lot of resistance to what was seen as development of the green belt. It was the Great Park consortium and the city council who had a major task in terms of making a green picture, to almost saying: 'look this is sustainable development' … Therefore, they talked about the concept of SuDS and lots of green space and that it would not be like looking at a housing site.
>
> (WaSC Officer 2012, interview)

The use of SuDS therefore fitted well within the concept of NGP. However, when the idea of using SuDS was conceived, there was a lack of legislation, policy and guidance. As SuDS were not commonly used, it was the influence of a single planning officer that was crucial. This planning officer decided to take an idea from an EA officer forward, as it fitted within his perception of NGP. The EA officer stated that the influence of the planning officer was crucial: 'he was very green in his approach, so if it had been a different planner it might have been completely different' (EA Officer B 2012, interview). One developer also recognised the importance of the planning officer in the development of SuDS. He explained that the planning officer:

> was a bit of a 'greeny' at the end of the day, who was required to undertake a project that perhaps cut through some of his morals. We are where we are and [the planning officer] was actually instrumental in it.
>
> (Developer A 2012, interview)

Therefore, the planning officer preferred a solution to flood risk that was sustainable and he used his agency to drive the idea forward, even though he did not have much support initially:

> My boss, the chief planning officer, took an interest to a certain extent, because he had to. However, within the council there was no one particularly driving this, until quite a lot later down the road when flooding became more of a public issue, because there were actual floods.
>
> (Planning Officer B 2012, interview)

To achieve their goals, the council used their resources that enabled them to designate land and give permission for development. They used this resource to exercise power over the developer, with the aim to include SuDS in the development and receive money to fund them. However, knowledge about flood risk was limited. In the past, the council had acted as an agent for the water board, but when that changed, the drainage experts moved out of the council:

> There might be one or two people doing highway stuff, but there was no one to go to ask for help and advice. Our engineers at that point were not that interested, so when the design and the calculations [on the SuDS] came, we realised we did not have anyone who could advise us. Therefore, we took on external consultants to help us judge each submission on each of these ponds in terms of capacity.
>
> (Planning Officer B 2012, interview)

The council hired consultants to overcome the lack of knowledge, but the planning officer felt that they did not stay on long enough. He claimed that if there had been more expertise, the design and the location of the SuDS could have been influenced further. In addition, instead of just storing water, they could have also improved water quality, but the consultants were only able to look at the capacity of the ponds (Planning Officer B 2012, interview). Even when in 2005 a drainage engineer, who also worked on the SuDS in NGP, returned to the council, the council relied heavily on the EA:

> Who has got the skills, the expertise and the technical stuff about flood risk? It is the people at the Environment Agency … There is no point in us duplicating that; we just fall back on their expertise.
>
> (Planning Officer A 2012, interview)

The financial resources for FRM were limited. No public funding was used to develop NGP; instead the developers purchased the land and financed the build. NCC also

needed to secure money though the s106 agreement to fund their work on the SuDS. A planning officer noted that the council perhaps did not secure enough money, not only due to the planning chief being eager to sign an agreement with the developers and go ahead with the development, but also because of a lack in knowledge on maintenance costs:

> The planning boss at that time wanted to be seen doing and agreeing things. Most of the planning staff thought he had rushed this agreement through, so the money to cover open space and maintenance of these areas was not enough … That was the lesson: make sure that you look at not just the design, but also the management maintenance implications of taking these things [SuDS] on … We did quite a bit of calculations on the possible management and maintenance but I think some more expert input at that point would have been useful. Almost inevitably, we would probably have put on a more realistic cost and made sure we had secured that.
>
> (Planning Officer B 2012, interview)

At the same time, the developer claimed that the council was asking for too much money for the management, which was more than the developers had spent during the eight years they had maintained the SuDS. As the developer said:

> The future maintenance of them [the SuDS] and who takes responsibility is more complicated than the actual mechanics of SuDS … The council does not want to take liability and I do not blame them, they have no money.
>
> (Developer A 2012, interview).

Environment Agency, North East office: From the beginning of the NGP project until recently, two EA officers have usually been involved in the governance network. According to the council engineer, because the same people have been involved for a long time, this built commitment, understanding and knowledge amongst actors, which also meant that everyone remained aware of any issues (Council Engineer 2012, interview). This stable involvement therefore helped to promote a good working relationship.

The EA's interests are derived from the Environment Act 1995: they exercise a general supervision over all matters relating to flood defence and aim to achieve sustainable development. In this governance network, they therefore wanted, above all, to manage flood risk and preferably in a sustainable manner. However, in the early stages of planning for NGP, there was no legislation, policy or guidance on using SuDS. The EA officer had learned about the existence and use of SuDS through a conference abroad

and believed NGP would be a suitable development to implement SuDS. As one planning officer said: 'By chance the person we talked to in the NRA and the EA was quite progressive and keen to push sustainable drainage' (Planning Officer B 2012, interview).

The EA's perceptions of flood risk were mainly based on the research they conducted or commissioned. However, their knowledge of SuDS was limited, as they had not been applied often in the UK and therefore, they used examples from other countries. As knowledge on FRM developed, some adjustments had to be made to the flood risk measures. For instance, land in Cell G was raised and the SuDS were linked with the Ouseburn to provide wider flood risk benefits.

In this governance network, the EA did not have the resource of the Flooding Direction, as this legislation only came into force in 2007. One EA officer also found that there were no guidelines or legislation they could use to promote the use of SuDS. Therefore, they used persuasion (EA Officer B 2012, interview). After the decision was made between actors to use sustainable drainage, it became embedded within binding agreements with the council, developers and the EA. The EA also did not have the financial or regulatory resources to support the maintenance of these SuDS, which meant this issue had to be resolved between the developers and the council.

Consortium of private developers: The consortium was composed of multiple private developers. The developers' interest was to produce a profit from purchasing land and selling houses; therefore, they were interested in all issues affecting this profit. However, to be able to develop, they had to obtain planning permission. Therefore, the management of flood risk was important to them in order to gain planning permission and increase the attractiveness of the development. According to an EA officer:

> The developers took a little bit of persuasion, but I think they were generally happy if they knew that these features [SuDS] were going to be taken off their hands.
>
> (EA Officer B 2012, interview)

The developers agreed to use SuDS, because they were planned in areas that were not designated for housing, so they would not lose any developable land and profits:

> We worked with the council to produce a development brief and the development brief said: 'this is the drainage and we want to bring SuDS into it'. It was not an absolute requirement, but I think we bought into it.

> How could you not buy into SuDS, when you are building on half of the site and the other half is open space for a variety of uses?
> (Developer A 2012, interview)

Furthermore, SuDS were financially attractive. A development the size of NGP would need an extensive network of underground pipes and tanks. SuDS were cheaper to construct, they provided an attractive landscape for the development and houses overlooking water increased in value. However, the developers agreed only to use end-of-pipe storage ponds and did not accept more dispersed or property-based source control, as this would be more costly and would need to be located in development land.

The developers held the financial resources to fund the SuDS, which meant they could exercise power over NCC. This for instance resulted in the use of SuDS that were less sustainable than imagined by the planning officer and the EA officer in the early stages of the development. The developers' knowledge of flood risk was derived from research conducted by the EA and by their own organisation and consultants. There was no disagreement between the council, the EA and the developers on the levels of flood risk and how they should be mitigated.

Water and Sewerage Company: Usually one particular officer represented the WaSC, who became involved in 1999/2000; therefore, actor presence was quite stable. The WaSC's responsibilities were set out in legislation, in particular in the Water Industry Act 1991, which required them to provide and improve the sewer system to drain an area effectively. They were responsible for underground systems, such as pipes and tanks, but not for water that was stored on the surface. The WaSC officer indicated that the consortium had asked them if they would adopt the SuDS, but they were unable to. Their only responsibility was for the pipes leading to the SuDS, which had to remain in good working order. Therefore, a legal agreement was created between NCC and the WaSC to guarantee right of outfall, performance and long-term management of those areas where underground pipes connected to ponds (Newcastle Great Park Advisory Committee 2004a).

The perceptions of the WaSC were derived from their own research on drainage and sewer systems. Their definition of the policy problem focused on the interaction between drainage and the sewerage systems and did not extend to SuDS. However, they did consider SuDS as a favourable solution, because it relieved the sewerage system. They were therefore in favour of SuDS, but were unable to contribute to their development. Moreover, the WaSC officer would have liked to have seen more source

control in NGP, but Ofwat limited how much they could invest. In addition, customers were not interested in individually investing in, for instance, rainwater harvesting systems, because the returns were small for them (WaSC Officer 2012, interview).

Civil Aviation Authority and airport: Local planning authorities were required to consult the CAA before granting an application within a 13-kilometre radius of an aerodrome. The SuDS, therefore, needed the formal approval of the CAA (Newcastle Great Park Sub-Committee 2001d). From 2003 onwards, the airports took over the role of statutory consultee as part of the Town and Country (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002. The difference between the CAA and the airport is that the CAA is a non-departmental public body and the airport is a private company. However, their duties concerning aerodrome safety are similar. Bodies of open water attract large birds, which create a bird strike hazard. As a result, the CAA and the airport were against any large areas of open water within the SuDS, but were satisfied that the reed beds prevented this. There was also an agreement that a warden at NGP would look out for any large birds on the development (Airport Officer 2012, pers. comm.). The airport had an added interest in that they welcomed the development as it might bring them more revenue (Newcastle City Council 1999c).

Ecology interest group: In a formal consultation on the DSSS for Cell I, an interest group involved in a project on otters expressed a concern on the SuDS. They felt there was not enough flood storage and that the watercourse and SuDS had limited wildlife value. However, the adaptations for improving the SuDS for wildlife benefits conflicted with the requirements to discourage birds of the CAA and airport (Newcastle Great Park Sub-Committee 2001e). Therefore, the council was limited in addressing their concerns.

Highways Agency: The Highways Agency played a small role in FRM issues in NGP. Their interest was to control runoff from the A1 and there was a discussion to connect runoff to one of the SuDS ponds if the A1 was widened. However, there was very little interaction with the Highways Agency as the widening programme was delayed (EA Officer A 2012, pers. comm.).

Councillors: Councillors from the areas surrounding NGP were involved through consultation and committees; for instance, the NGP Advisory Committee, where councillors could discuss issues directly with council officers, the EA and developers. At first, some councillors were opposed to the development and did not wish to become involved in planning for NGP. When they found it was going ahead, they became

involved in order to influence the details. The councillors' interest was also to solve any flood risk issues for the residents in their area.

The councillors interviewed had similar perceptions and preferences on FRM to the planning officers and the EA. They understood that flooding in their areas was not caused by NGP and they interacted with residents to inform them of this (Councillor A 2012, interview, Councillor B 2012, interview, Councillor C 2012, interview).

Residents outside NGP: Residents living near NGP were involved in the planning process through formal consultation procedures, but the council also developed informal consultation; for instance, exhibitions on the revised master plan that took place before formal procedures commenced (Newcastle Great Park Sub-Committee 2001c). In addition, panels were created to give community representatives from the wards surrounding the new development the opportunity to shape the development at an early stage (Newcastle Great Park Sub-Committee 2001a, 2001b). One of these panels focused on drainage issues. The panels only existed for a few years, because they were being organised by a coordinator whose post was time-limited due to funding (Newcastle Great Park Advisory Committee 2006b). However, the council also acknowledged there were limits to public consultation, as it was the developers' prerogative to devise plans for their land (Newcastle Great Park Sub-Committee 2001a).

The residents' interests were to protect and enhance their wellbeing and reduce or prevent potential flood risks to their own property; therefore, there was much at stake for them. However, as they were not directly involved in interaction between the decision makers, they did not share the same information sources. Instead, they received information through public meetings. They did have personal experience of flood events, and some members of the public had had their streets, gardens, garages or properties flooded. Therefore, their perceptions were, for an important part, based on personal experience and some had a predisposition to be suspicious of the council, developers and the EA and the research conducted.

The perceptions of the residents caused some conflict between them and the council, developers and the EA. As a result, these actors attempted network management aimed at changing the residents' perceptions. They did this by holding 'meeting after meeting, after meeting' (Councillor A 2012, interview). They shared information with residents and increased transparency in the way flood risk was managed. There were mixed feelings amongst the other actors whether this successfully changed perceptions. The

NGP Advisory Committee felt that it had increased public confidence in the SuDS (Newcastle Great Park Sub-Committee 2001f, Newcastle Great Park Advisory Committee 2006a). One councillor also found that the meetings were successful and that they had created understanding of the real cause of flooding (Councillor A 2012, interview). Another councillor argued that:

> basically people want two things: they want confidence there is a strategy or plan and clear accountability. Secondly, they want decent communications.
>
> (Councillor C 2012, interview).

By holding regular meetings with residents, the councillor felt that both points were addressed and people now understood the real flood risks in their area and the causes of this. However, one planning officer stated that:

> As early as 2000 there was a lot of suspicion growing and we had meetings and explained it, but I am not sure most people accepted what we said. It is not easy; at the end of the day a lot of it has to do with technical work on figures. Obviously you can go and explain exactly how you go through working the figures even if you do not go through the technicalities, but if someone is sitting there not willing to believe what you will say, it becomes quite difficult.
>
> (Planning Officer B 2012, interview)

In short, residents were only part of the governance network in a very limited way. Through the panel of residents they were able to have the most influence on decision making, but this was only short lived and it is unclear whether this had any influence on FRM. Residents also had limited influence through other consultation exercises. They lacked resources and therefore the power to influence FRM.

Residents within NGP: Future residents of developments are not usually involved in the planning process, because at that time they are unknown. As NGP was built in phases, some residents were involved in the implementation stage. Their interest was to obtain a high-quality living environment. However, some residents voiced concerns over the SuDS, especially when the ponds overflowed (Newcastle Great Park Advisory Committee 2004c). They were concerned the ponds were not functioning sufficiently. In addition, they felt that they had not been informed about the operation of the SuDS, even though they considered them to be attractive features (LRA Chair 2012, interview). Residents also felt that the process of adoption and maintenance of the SuDS was unclear and they were unaware of who held responsibility. Some were under the

impression that the council did not adopt the ponds. Therefore, there was much confusion regarding accountability for the SuDS (LRA Chair 2012, interview).

Residents have also experienced flooding from the Ouseburn to the rear of houses and there were drainage issues in gardens. In addition, drains in roads were blocked frequently due to the building activity in the area. Furthermore, they had concerns over the management fee that they pay and the unsuccessful attempts to communicate with the management company. They do not have much trust in the developers or the management company to resolve issues quickly (LRA Chair 2012, interview).

7.2.4 Wider context

The wider context entails structures and agents that influenced the governance network, such as formal and informal institutions and flood events. The most relevant influences are now described.

Formal institutions: During the early stages of NGP, the influence of the formal setting was characterised by the lack of regulations and guidance on FRM and sustainable drainage and the absence of standards for flood protection. On the one hand, this meant that there were issues with adoption and maintenance:

> As soon as PPG25 started talking about the use of SuDS, they needed to be clear who was going to own and maintain, because it has just been too easy for everybody to say: 'It is definitely not us'. As a private water and sewerage company we are certainly not going to take responsibility for something that our industry regulator Ofwat does not fund or support. From the city council's perspective, they are looking at grounds maintenance costs, which is a long-term liability. The developer is saying: 'I want to build houses and move on to the next site; I do not want long-term surface water responsibilities'. What is missing is that X will adopt them and this is how they will get their funding to do that.
>
> (WaSC Officer 2012, interview)

On the other hand, one EA officer claimed that the lack in legislation actually helped them to develop the sustainable drainage:

> Because there were no strict criteria about how you would do things, it probably gave us a bit of a freer hand to try something. Sometimes if you are constrained by what the legislation says, it probably stops you doing some things you may do otherwise.
>
> (EA Officer B 2012, interview)

Informal institutions: The informal institutional setting is shaped by the regular interaction between actors. In the case of NGP, this was the council, the EA, the WaSC and the developers. The personnel who have worked on the project mostly stayed the same, which enabled a close working relationship, with decisions often taken informally:

> We were starting to build good working relationships with the Environment Agency and water company and those relationships have continued to develop. We know and trust each other and we are all doing the best we can to work together to get the outcomes that people expect from us. It is not always possible, because there are limits and points where their responsibilities finish. However, we are working together and we have to get to the point where we do trust the information that we are being given, otherwise we could spend all our lives checking each other and nothing would happen.
>
> (Council Engineer 2012, interview)

However, one of the EA officers found that the council should have carried out more compliance checks to ensure the SuDS were built according to the conditions: 'Newcastle City Council are quite quick to discharge conditions without having the evidence and I find that a little bit unsettling' (EA Officer A 2012, interview).

The council and the developers had a fairly good relationship with each other:

> I think it is fair to say that there is a pretty good working relationship between the various parties involved, which allows that informal meeting and governance to happen rather than having to go through some formal decision-making structure every time. They [the developers] try to fix things as quickly as possible through informal communication. Sometimes there may be need for some formal action to be taken, whether that is serving notice or because it [SuDS] is not doing something it ought to be doing, but it is very rare that that happens. Usually things get sorted out on an informal basis.
>
> (Planning Officer A 2012, interview)

> You are all officers and we are sort of friends as well, because I do not get away with murder. They understand the commercial realities of life and I understand what controls have to be put in place.
>
> (Developer A 2012, interview)

However, the developer does explain that 'we have had episodes on the Great Park where we have not trusted one another, but I think that is years ago' (Developer A 2012, interview), which most likely refers to a breakdown in communications between developers and the council in 2003 due to changes in the ownership and direction of the consortium. The council wished to revise the master plan, whilst the developers wished to develop each cell incrementally on the basis of the old master plan. The consortium

at that time had also stopped pre-application discussions with planning officers (Gosforth and North Newcastle Area Committee 2003). The relationship improved when the council did not register a planning application submitted by the consortium and communication between parties started again.

One planning officer stated that even when there were disagreements between the council and developers, there was always consensus about the principle of using SuDS:

> There were never any arguments about the broad principle; there were issues around some of the details and the capacity and the design of the outfalls and that sort of thing later on. That was not an issue of principle, that was an issue of detail. The solution we went for suited them … But when it got down to the details for these ponds and when we requested calculations and figures, it usually took quite a long time … It was sometimes not very easy to get the information you needed and then quite often they would do what they wanted to do anyway and then hope that it would be approved.
>
> (Planning Officer B 2012, interview)

In addition, the council and the developer seemed to point the finger at each other to explain the delays in adoption. One planning officer claimed the developers 'dragged their feet a lot' (Planning Officer B 2012, interview), whilst the developers blamed the council for not being willing to adopting a SuDS pond, even though everything went by the book (Developer A 2012, interview).

Furthermore, councillors and residents had their own opinions on the actors within the network. A councillor interviewed found that there was a discrepancy between the EA being a national, semi-public organisation and the local responsibilities they had:

> I do feel sometimes that the EA is being managed through a completely different structure, which is not democratically accountable, because it goes through to government in London.
>
> (Councillor A 2012, interview)

Some were also concerned about the status of the WaSC:

> [The WaSCs] are privatised and perhaps they should not have been. They are very reluctant to spend capital … I think their reluctance to invest from about 1995–1996 onwards until 2005–2006 when they absolutely had to, was a real issue. If you are saying what would I have done differently, I probably would not have privatised.
>
> (Councillor C 2012, interview)

> There is a fundamental contradiction between a natural resource that affects everybody and its private ownership, in this case its ownership by a corporation thousands of miles away.
>
> (Green Party Representative 2012, interview)

In addition, some councillors felt that the management company should not have been made private:

> We did try to make the management company to be a cooperative and non-profit-making business and they [the developers] all nearly fainted and fell around laughing and said: 'No, it is a money-making venture'. That is the problem; it would have been wonderful if the residents were paying the money in and then they decided how all of that money was spent. It would have been real hands on, 'this is our park', as opposed to 'we pay and you decide'.
>
> (Councillor C 2012, interview)

Lastly, residents within NGP did not seem to have much trust in the developers, as some issues were taking a very long time to resolve, and in some gardens water would not drain because of building rubble. The chair of the LRA believed the builders had no conscience and therefore did not trust some of the flood risk measures that have been put in place, such as the piles upon which the houses in Cell G are constructed. However, the residents did trust the EA to check the FRM measures carefully, as the EA were perceived to maintain tight control (LRA Chair 2012, interview). Residents were also looking to the council to manage flood risk, but the council was limited in what they were allowed to do. As one councillor said:

> You have to have a clear leadership role for the council in dealing with flood management, with powers as well, because otherwise you have this tripartite responsibility that in practice depends on the individual making it work. The general public does not think much of it, because the general public wants a solution to the problem.
>
> (Councillor A 2012, interview)

Other structures: The environment was of importance through the layout of the site with large open spaces along the river that could provide space for storage ponds. This meant that the development became suitable for SuDS, whilst it also did not interfere with the developers' interest of making profits.

Changes and events: One crucial event is that an EA officer attended a conference on sustainable drainage and then used his agency to introduce this idea to a planning officer. SuDS were not well known in England at the time, and without this event SuDS might not have become part of NGP.

Other important influences were flood events in the area. As flooding had occurred in the past, the local authority and the EA were aware it was an issue for NGP. Flood events after the outline planning permission meant that knowledge on flood risks and on the SuDS developed, leading to some adaptations to the development and SuDS. It also instigated more research into flood risks caused by NGP, which confirmed that the measures taken in NGP worked sufficiently. However, as one planning officer stated, there were still many uncertainties:

> It is not an exact science. I thought it was all going to be fairly exact, but then you realise the EA and others have little rules of thumb and cut a few corners.
>
> (Planning Officer B 2012, interview)

7.2.5 Flood risk management

Flood risk in NGP is managed through the use of sustainable drainage, being one of the first developments in England to use SuDS. This outcome may be explained by the actions of two actors who drove forward the use of sustainable drainage. In addition, the character of the development itself formed an opportunity for the use of SuDS. However, the SuDS were limited to end-of-pipe ponds, because the developers only agreed to this type of drainage.

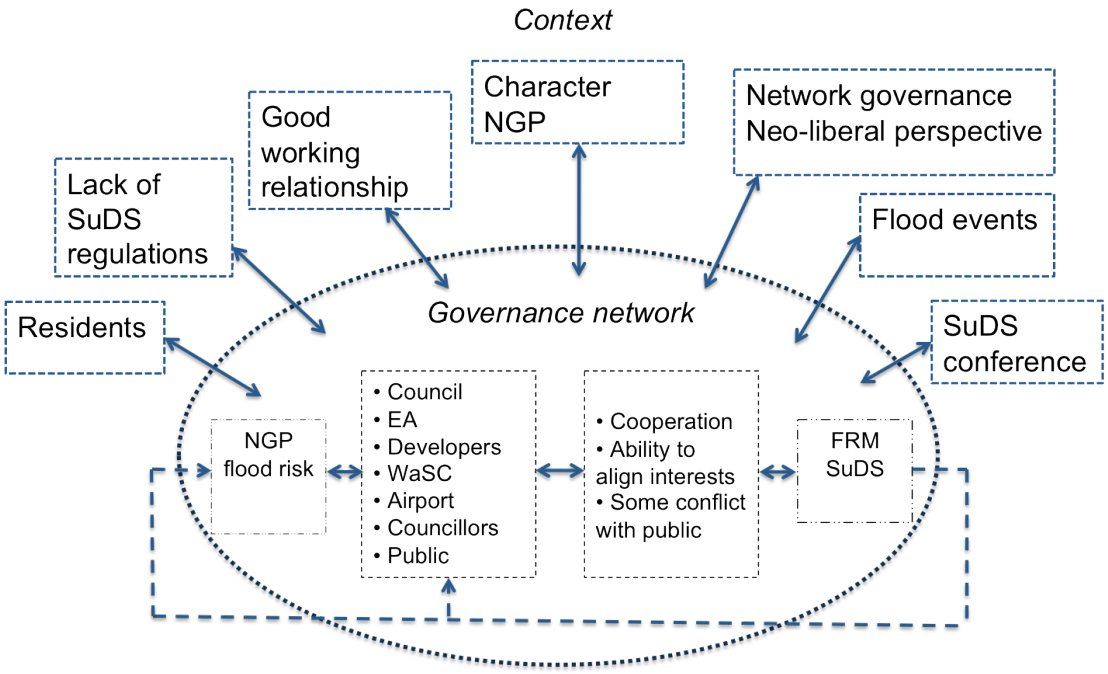

Figure 31: Functioning of governance network of Newcastle Great Park

Due to a lack of regulations, policies and guidance, in combination with the inexperience of the actors in implementing SuDS and constantly changing flood risk knowledge, FRM was adapted over time. Firstly, as the Ouseburn's floodplain became wider, Cell G needed to be adapted. Secondly, some SuDS were adapted after flood events. As one council engineer explained:

> People did take the best decisions and provided the best information at the time. However, through reviews that have been done along the way, there is evidence to show that our estimates were a little bit a way off the mark. We are doing our best to manage the situation. As we develop the site and our information and data improves, the quality improves.
>
> (Council Engineer 2012, interview)

When the actors were asked if they were happy with the SuDS, mixed reactions were given. The planning officer and EA officer, who were involved from the start and who were important driving forces, indicated that they would have liked more sustainable forms of drainage within individual development cells and within properties. However, they also indicated that even though this option was raised, the developers discarded it as it might have impacted on their profits (Planning Officer B 2012, interview, EA Officer B 2012, interview). The WaSC officer agreed and found that the ideas in the early stages of planning had not become reality:

> All that vision early on and all of the vision that was in the Environmental Statement just has not happened. Within the master plan it talks of all the different SuDS that could be used, but they actually have not been used.
>
> (WaSC Officer 2012, interview)

The developer had mixed feelings:

> It is just doing what it says; the ponds work. But SuDS are a pain, which is all I can describe them as. Especially compared to more traditional piped solutions, which are big pipes in the ground that builders can put in and then they just get on with it. But I cannot say it is the wrong thing and I do have other projects with them in.
>
> (Developer A 2012, interview)

Lastly, there was an issue with maintenance and adoption. Due to lack of regulations to support the use of SuDS, it was unclear who would adopt them. The developer said on this matter:

> We had [the WaSC] saying: 'We are not responsible for it', we had the Environment Agency saying: 'Yes, it is all great, but it is not ours, and us saying: 'That is fine, it is our open space'. The council under the legal agreement were obliged to adopt the open space including the SuDS, but the council did not have any experience.
>
> (Developer A 2012, interview)

The decision was made that the developers would establish a private management company, funded by the residents paying annual management fees. This solved the problem with maintenance costs, but the residents in NGP and councillors were concerned about transparency and any consequences of a private company taking on public services (LRA Chair 2012, interview, Councillor B 2012, interview).

7.3 Chelmsford cricket ground development

This section discusses the governance network for FRM for the Chelmsford cricket ground development, following the same structure as in the previous section on NGP. The functioning of the governance network is visualised in Figure 32 on page 192.

7.3.1 Formation of the governance network

The governance network was formed when the cricket club started discussing ideas to redevelop their ground with the council. At first, these were informal discussions, which eventually led to the creation of a planning brief that signalled the council's intent to approve redevelopment. These two actors therefore formed a voluntary network. When the planning application was submitted, the EA, residents and councillors became involved through formal consultation. At this point, the network expanded through mandate. Ultimately, the governance network was unable to reach a decision, because the EA blocked the council's power to approve the application. The governance network failed and the decision was referred to the SoS.

7.3.2 The policy problem

The governance network was formed around the problem of flood risk on the site of the proposed development. The site is adjacent to the river Can and forms part of a functional floodplain. In the early stages of the development, when it was part of the planning brief and the AAP, this flood risk was not in conflict with development aspirations to build approximately 100 dwellings. The EA did not object to the

development, because they thought there would be no development taking place within the functional floodplain. However, when the application was submitted, the number of dwellings had risen to over 400, with a proportion of the dwellings planned within the functional floodplain. At that point, the problem definition differed between actors, as explained in the next section.

7.3.3 Actors, characteristics and interactions

The actors who were part of the governance network were the council, the cricket club, the developers, the EA, planning and flood risk consultants, residents and councillors. This section describes the characteristics of these actors in more detail.

Chelmsford Borough Council and planning officers: The council found it crucial that the cricket club stayed in their current location in the centre of the town. In the Local Plan of 1997, policies were formed to ensure sports facilities in the centre alongside the river Can remained there. In particular, the football club and cricket club were considered to contribute to the attractiveness of the town (Chelmsford Borough Council 1997). However, not long after the Local Plan was published, the football club left the site and a planning application was submitted for residential development. The council refused permission, based on their Local Plan, but in a public enquiry the decision was made to grant permission, as it was deemed to be more beneficial to the area than refusal (Rowlands 1999). The loss of the football club might have contributed to the efforts by the council to retain the cricket club.

As the council wanted the cricket club to remain in their current location, they supported their plans for redevelopment. For instance, they included a council car park to enable development and agreed to bring the application forward even though there were some issues, such as a higher quantity of development than first expected, development in a functional floodplain and problems with overlooking. One planning officer felt that there was much pressure from the club and their development partner on their consultants to get the application in, whereas it would have benefited from more pre-application discussions. Even though the planning officer thought that flood risk was addressed sufficiently when the application was submitted, they felt uncomfortable with the relation of the development to existing housing (Planning Officer C 2012, interview). Residents also felt the application was being rushed through, without sufficient regard to a fair planning process:

> There was a sense that they [the planning officers] had already made up their mind and they were effectively being blackmailed by the cricket club: 'If you do not give the planning permission, we will move the out of Chelmsford'.
>
> (LRG B 2012, interview)

Some interviewees indicated that there was not only pressure from the cricket club and developers, but also from political leaders in the council to approve the application, despite outstanding issues such as flood risk:

> I think the planners from a technical point of view were certainly cognisant and they understood all the issues of flood risk. Politically, they were taken down a route, which was saying it had to happen. Therefore, from their point of view they had to try to deliver what the political council said should happen.
>
> (EA Officer C 2012, interview)

However, even apart from this application the council's perception of flood risk was that it was an important consideration, but it should not prevent regeneration of the town centre, as shown in the Core Strategy and the AAP. One planning officer described it as follows:

> This is the historic centre of the borough; it is a Roman city and it has been here a long time. It makes a lot of sense logically to collect your new development next to existing shops, houses, transport links and so forth. There is such a large imperative to put it here that flood risk becomes one of those constraints that you have to deal with, rather than using it as an issue to stop, frustrate or put development somewhere else. The line that we would take, as long as things are safe and we do not make the situation worse elsewhere, we will carry on.
>
> (Planning Officer D 2012, interview)

The council did not have any financial resources to mitigate flood risk on site, because it was a private development, but they were able to provide a plot of land to enable development. Furthermore, they had some in-house knowledge of flood risk, which developed on an ad hoc basis by responding to circumstances. Due to a significant flood risk in the town, and the council's responsibility for local flood risk, CBC felt that there had to be a planning officer involved who was specialised in flood risk (Planning Officer D 2012, interview). However, one planning officer conceded that even though they had some expertise, they would never have the knowledge that the EA possessed (Planning Officer D 2012, interview). The flood risk consultant, who had worked with the council and the EA, also claimed that: 'planning officers are often very open to ideas from us, but they do not have the expertise and are not competent in flooding matters' (Consultant B 2012, interview).

Cricket club and planning consultants: The cricket club wanted to renew their facilities, comply with cricket regulations and generate more income from new facilities such as a conference centre. They were content with their current location in the town centre, but would have moved if necessary. However, because the council was opposed to them moving away from the centre, they decided to create plans for a redevelopment on site. To generate sufficient income for redevelopment, they selected a developer to build residential dwellings. The cricket club had some financial resources to invest in the application. Before building commenced, they had invested £500,000 and they were generating income from the leasing of land used for residential development (ECCC 2013). They did not have planning expertise and therefore hired a planning consultant, whilst flood risk issues were left to the developer and flood risk consultants.

The cricket club did not believe there was a large flood risk on site, because in their experience there had only been shallow, slow moving water. They also trusted in the flood risk measures designed for the development. They did find that flood risk posed a major obstacle to development and even more so after the EA became a statutory consultee, which meant the application was referred and thereby delayed (Cricket Club Manager 2012, interview). Ideally, the cricket club wanted the application to be approved quickly, so that it would not interrupt the cricket season. An EA officer, a councillor and residents felt that, as a consequence, the cricket club had placed considerable pressure on planning officers and the planning committee. For instance, one councillor stated that:

> The consultation time on the application was very short, especially for the scale and significance of the application. This was due to pressures that were really vocal and really hard by the cricket club, who were speaking most unreasonably to the councillors and the planning committee when doing public questions … The club representatives at the committee made threats to the committee: 'If you do not approve, we will be forced to leave Chelmsford', which was actually stated during a meeting.
>
> (Councillor D 2013, interview)

Developers and flood risk consultants: The developers were selected by the cricket club to plan and implement the residential development. The developers had invested in the development and therefore had an interest in gaining approval. Their perception of flood risk was that it formed a constraint to development. To address this constraint, the consultants developed their own model to calculate flood risk and disagreed with the EA on risk levels:

> There was a lot of debate and discussion about what the flood levels actually were. As I discovered through the process, it is not a science, it is an art. You can take various readings and then you have to extrapolate those readings as best as you can. What we found was that the EA were extrapolating readings very differently from how we would have extrapolated them. There was a big question as to what the flood levels were actually going to be.
>
> (Developer B 2012, interview)

An EA officer, on the other hand, argued that the reason the consultants developed their own model was to reduce flood risk and enable development, but they were not addressing the flood and safety issues sufficiently (EA Officer C 2012, interview). One councillor stated that: 'The developer only seemed to react to the possibility of a refusal or permission; that was the only thing that conditioned the applicant's attitude' (Councillor D 2013, interview). Some EA officers felt that the consultants were only trying to achieve their own goals and were not going to compromise with the EA. Moreover, one EA officer felt that the consultants were trying to cheat to have the application approved (EA Officer D 2012, interview).

Environment Agency: The EA were involved in assessing flood risk for development as part of the AAP and through the planning application. For the application, three different teams were involved (EA Officer C 2012, interview). Their perception of flood risk was based on their risk models. Their knowledge of flood risk is constantly developing as techniques improve and new flood events provide more information.

The EA's interest was to ensure flood risk did not increase for existing properties and they were therefore against the principle of developing in functional floodplain, based on PPS25. Even though the EA also had some issues with the way flood risk was managed, they believed they would have been able to resolve these, but were clear that they could never agree to properties being built in the functional floodplain: 'on that policy side there was not much scope for negotiation, but on the flood risk management side of things there was some' (EA Officer E 2012, interview). They therefore objected to the application and decided to sustain their objection, because they were concerned that it would set a precedent (EA Officer E 2012, interview).

One planning officer stated that the EA also did not consider flood risk mitigation for future development, but only for existing properties. This is a result of how they fund new flood risk measures, which is based on the value of existing built development: 'they did not see themselves as drivers of economic growth, but as simply protecting

property and the environment' (Planning Officer D 2012, interview). This therefore differed from the council's perception, in which reducing flood risk was an important measure to enable regeneration.

Overall, the cricket club, developers and flood risk consultants had difficulty with the EA's attitude in the decision-making process. They found that the EA were not pragmatic and tried to stop the development because of their principles. For instance, the developers claimed that: 'the EA were very pedantic and they did not seem to live in the real world' (Developer B 2012, interview). The flood risk consultant described the EA's approach as follows:

> They have policies saying they will not support anything that increases the number of people at risk of flooding. How they interpret that is quite zealous and they do not need to be flexible in their opinion, because they are only interested in flooding; they have no interest in other planning criteria.
>
> (Consultant B 2012, interview)

However, the consultants and a planning officer believe that the EA have become more flexible in recent years. The planning officer said that:

> They are interested in making sure you do not make the situation worse and there is no harm to other sensitive parts of the city centre. However, they are a lot more relaxed about it than they were a few years ago, when they said 'no' in capital letters … The cricket club application approval sent a nasty shock to their organisations. I think they had several appeals at the same time. They often talk about that as an organisation it was quite a traumatic experience to lose; they did not expect it.
>
> (Planning Officer D 2012, interview)

However, the EA are still holding on to some principles, which became apparent more recently in planning new flood risk measures for Chelmsford:

> They were very adamant there should be no loss of functional floodplain and you started to get quite contrived solutions. Odd suggestions came forward, even if you could prove that the loss of that floodplain did not do harm anywhere. They were absolutely adamant that it should not be sacrificed.
>
> (Planning Officer D 2012, interview)

Residents: Residents became involved through the planning application, with concerns about overlooking and traffic. They had some concerns about flood risk as well, especially after experiencing a flood in 2009. Their perception of flood risk was therefore mainly based on their own experiences, whilst also using it as one of the arguments for objecting to the development. One of the flood risk consultants felt that:

> Local residents will pick up on what the EA is saying and use it as ammunition to make their case … When the EA makes an objection, residents will often use flooding as a reason to object irrespective of the fact they will not be negatively impacted by flooding.
>
> (Consultant B 2012, interview)

In the public inquiry, residents left the technical aspects of flood risk to the EA, as they lacked the expertise. They did however describe the consequences of flooding for residents in a block of flats near the application site, when they lost their electricity and water supplies and some elderly residents were unable to leave their apartments. They therefore placed their trust in the EA, whilst being sceptical of the developer's intentions. They did not trust the mitigation measures the developer included in their plans; for instance, they felt the warning system was inadequate and egress unsafe (LRG A 2012, interview, LRG B 2012, interview).

Residents also believed the planning process had been unfair, because the planning officers 'were not applying even-handedly their own policies and they were not interrogating the proposals by the developers to the right degree' (LRG B 2012, interview). The residents complained to the council through their complaints procedure, but because the residents felt the council had not resolved their complaint, they carried it forward to the Local Government Ombudsman (Local Residents' Group 2009f). However, the residents found that the complaints process took so long that by the time they could refer it to the Ombudsman, the application had been called in by the SoS (LRG B 2012, interview). As a result, the Ombudsman reported that they would not be investigating the complaint, as 'in the absence of a decision it could not be determined that a sufficient injustice had taken place' (Local Residents' Group 2009f: 42).

Councillors: Councillors were involved in this process by representing residents, being part of the planning committee and, in the case of one councillor, being part of the public inquiry. The councillor involved in the public inquiry believed that those councillors who sat on the planning committee were under pressure from the cricket club, council leaders and lead planning officers to approve the application (Councillor D 2013, interview). Residents also believed that these councillors had predetermined to approve the application without considering the issues sufficiently, whilst some were also members of the cricket club (LRG A 2012, interview, LRG B 2012, interview). According to one EA officer, the members were caught between their loyalty to the cricket club and the opposition they experienced from the residents; therefore, they did

not want to take the decision themselves, rather preferring to leave it to the SoS (EA Officer C 2012, interview).

7.3.4 Wider context

The wider context entails structures and agents that have influenced the governance network, such as formal and informal institutions, flood events, and any influential outside networks or agents. The key structures will now be described.

Formal institutions: The formal institutional framework was mainly composed of national policies and regulations on flood risk and planning. The governance network was established when FRM was part of the planning system through PPS25 and when flood risk was a material consideration. Regulations also meant that the EA had become a statutory consultee and the Flooding Direction was created. This meant that the EA now had strong resources to achieve their interests, which they used to exert power over the other actors by blocking local decision making. Local policies also influenced the network. The council had policies to achieve regeneration of the town centre, in combination with retaining the cricket club in its town-centre location.

Informal institutions: Interaction between the council and the cricket club started in the early 2000s, whilst the developer joined the network later. The EA received a request for data in the pre-application phase, but was formally consulted after the application was submitted. There were regular discussions between the council, the flood risk consultants and the EA to resolve the objections from the EA.

The interaction between the council and the cricket club, developers and consultants was considered positive:

> The council was very understanding of our needs to develop and we started a sensible dialogue with them. They remained adamant they wanted us to stay in the centre of town and confirmed they would work with us to make sure we would have everything we needed to facilitate our build here.
>
> (Cricket Club Manager 2012, interview)

Therefore, this positive working relationship was influenced by the council's desire for the cricket club to stay within the town centre (Consultant A 2012, interview, Councillor D 2013, interview). One councillor described the decision to approve the application as being a:

> high-level council decision rather than a planning decision. There was a little bit of grey, more than a little bit of grey, in the mix of how this whole thing was treated.
>
> (Councillor D 2013, interview).

As a result, there was pressure on planning officers to approve the application. For example, one planning officer said that the application was submitted too soon and it would have been better to object to the parts of the application that caused overlooking for some existing residents (Planning Officer C 2012, interview).

The interaction between the cricket club, developers, consultants and the EA was conflicted. All three EA officers interviewed stated that the flood risk consultants hired by the developer were difficult to work with. The discussions were not friendly:

> The consultants who they [the developers] appointed clearly had a brief to deliver something regardless of how they did it, but they were really quite unpleasant about it. It got to a point where on a number of occasions I actually put the phone down on the consultants, because they were just being totally unreasonable and being actually vaguely abusive.
>
> (EA Officer C 2012, interview)

The relationship between the EA and the consultants was very strained and the process of negotiation went from awkward to impossible. This relationship affected the interaction:

> It makes you not very keen to adopt a flexible approach when you have a consultant who is clearly himself inflexible and is trying to get a result regardless of what is reasonable. In many instances, if there is something on site to how you can solve a problem, we will suggest it. But why am I going to help them, why am I going to help the developers to develop then?
>
> (EA Officer C 2012, interview)

The planning consultants found the opposite: they claimed that the EA were uncooperative and that every time the consultants solved a problem, the EA came up with a new one. The EA were unreasonable and were not prepared to concede (Consultant A 2012, interview). The developers also found that the EA were very frustrating to work with and would not agree with their flood risk results:

> In the end we had to compromise with them and pretty much take their readings, because there was very little movement from their end. But ultimately we designed a scheme which everybody agreed was safe, it was appropriate and caused no additional flood issues to any of the neighbouring properties, but still the EA refused to accept it.
>
> (Developer A 2012, interview)

The cricket club and the flood risk consultants also found that the EA were not cooperating:

> The difficulty I had was that there was no level of flexibility; it was either yes or no, black or white. There was no creativity in terms of' 'let's see if we can work with you to see how we can manage the development' … The obstruction was the fact that the EA was digging in on a policy issue rather than a safety issue, because we could demonstrate that in the event of a flood this site would be safe.
>
> (Cricket Club Manager 2012, interview)

> They worked with us, they did not ignore us, but they were very much against everything we tried to do. One particular gentleman of the EA appeared to take it very personally, to the extent that I did not allow my staff to liaise with him anymore, because he was particularly rude to them. I had to take over on the liaison with that particular officer.
>
> (Consultant B 2012, interview)

The flood risk consultant believed that this was a common attitude from the EA, as this negative interaction was repeated during other applications as well:

> It is often a confrontational situation between the EA and us. That is a shame, but we have to do the best for our client. That means the most accurate and realistic assessment of flood risk, which the EA do not always like, because they like to take a more conservative approach.
>
> (Consultant B 2012, interview)

The relationship between the council and the EA had been good prior to the application; they had been in regular contact to discuss flood risk in developments in the town centre for the Core Strategy and the AAP. Therefore, when the council and the EA disagreed over the planning application, one of the planning officers felt uncomfortable doing so and was worried it had affected their relationship permanently:

> I always felt uncomfortable with the way we were not working with the EA on this one. We are used to a collaborative approach with such a key consultee. I was concerned how this would affect wider relationships with them to be honest.
>
> (Planning Officer C 2012, interview)

In spite of this, one EA officer stated that the process had not altered their working relationship:

> The council felt the application should be approved and we felt it should not, because it is contrary to policy. We worked very well up to a point and we work well with them again now.
>
> (EA Officer E 2012, interview)

However, the flood risk consultants thought the relationship between the EA and the planning officers was worse than they admitted:

> The planning officers are often torn between what we say and what the EA say when they are two different things. The EA is the competent authority that is there to advise them, so theoretically they should take the EA's position in preference to ours … They will listen to the EA and us and often try to work with the EA to get them to be more pragmatic. There are plenty of situations when planning officers are feeling frustrated and let down by what is seen as an intransigent and zealous approach by the EA.
>
> (Consultant B 2012, interview).

Moreover, some residents and a councillor lost their trust in CBC's planning process over this application. They were critical of the process and believed that the application had not been discussed sufficiently. They claimed that leaders of the council, lead planning officers and councillors used their power to have the application approved and some of them were members of the cricket club:

> I almost lost complete confidence in the process as a result … The council leader and lead officers found the means to pacify, placate and accede to the terms of the cricket club and the applicant.
>
> (Councillor D 2012, interview)

> You can have any process you want, but if you want to get a decision through, it is who you know, not what you know. Therefore, my view of the planning process is tainted: there is no true justice in the process.
>
> (LRG A 2012, interview)

> So long as you have politically motivated individuals, who are guided by senior officers, who may have an agenda that is outside planning policy, you are going to have situations like this.
>
> (LRG B 2012, interview)

The differences between parties were also apparent during the public inquiry. Prior to the inquiry, mediators attempted to help the parties to resolve their issues, but they were unsuccessful. During the inquiry, CBC and the developers hired barristers from the same practice to make their case. The residents and the EA felt the developers' barrister was aggressive and tried to discredit them and their professional judgement:

> The barrister was clearly trying to show everybody as being a total idiot; not trying to actually consider the issues, but just to show the people he was combating that they did not know what they were talking about. He would deliberately try and get you to say things that bluntly would contradict what you were trying to say. It was not a pleasant approach.
>
> (EA Officer C 2012, interview)

The developers on the other hand, found that the barrister had helped to make clear that the EA did not have a case:

> The EA was very pedantic and they did not seem to live in the real world. Particularly in the public inquiry, when they were being cross-examined by the barrister, it became painfully clear that they were attempting to apply the letter of the law as they had interpreted it. They were using no common sense whatsoever.
>
> (Developer A 2012, interview)

Some actors also felt that the change of SoS had influenced the outcome. The residents stated that the SoS was a resident of Essex and a supporter of the cricket club and was therefore partial to the application being approved (LRG A 2012, interview, LRG B 2012, interview), whilst one EA officer claimed that:

> As soon as [Eric] Pickles [the new SoS] came in, he just agreed to anything concerned with development. Every single inquiry for the first many months he would just let through on the basis that it was development and development was good. It was a very disappointing time in that respect.
>
> (Planning Officer C 2012, interview)

Flood events: Flood events played an important role. Firstly, due to historic flooding, Chelmsford had protected its town centre against flooding, thereby stimulating more development to take place along the river. Secondly, as flood risk was an important issue in Chelmsford, but the council also wanted to regenerate areas at risk of flooding, a planner was appointed who had expertise in flood risk. This increased the council's knowledge on flood risk and this might have contributed to the reason why the EA became involved in the application at a later stage. Thirdly, flood events allowed actors to gain knowledge on flood risk. Recent floods showed that the flood risk to the site was higher than expected and a flood just before the public inquiry showed the real risk of flooding to the site. This event was used by both sides in the public inquiry: by the objectors to show that flood risk was real and had many consequences for residents, and by the applicants to show that the extent of flooding on the development site was not great and unlikely to cause any danger.

Pre-existing relationships: Pre-existing relationships were also an influential factor. For instance, the cricket club did not have a good relationship with the council in the 1990s, when the council was trying to block the club from moving by designating the grounds as a green wedge, which prohibited development. When the council went through a

political change, the relationship became more positive when CBC supported the cricket club in their development needs.

In addition, one of the flood risk consultants claimed that he had experienced confrontational situations with the EA on multiple occasions. Therefore, when such actors meet in new governance networks, they may anticipate conflict and will adapt their behaviour accordingly. For instance, instead of attempting cooperation from the onset, they may develop strategies to increase their power over the other actor to try to reach their goals.

Central government as decision maker: The local governance network was not able to reach resolution and the application was referred through the Flooding Direction. It was discussed in a public inquiry, where the inspector recommended refusal. After the public inquiry, the decision was delayed when central government went through a political change. A new SoS made the final decision and he granted permission based on an amended scheme. This SoS wanted to stimulate development in the country and therefore prioritised the social and economic benefits of the application over the principle of not building in a floodplain. There can only be speculation about whether the previous SoS would have judged the case differently, but the national political change might have been influential.

7.3.5 Flood risk management

The local governance network was unable to reach a decision, and instead, the actors were required to make their case in a public inquiry. Subsequently, a national actor took the final decision to approve the development, with no changes to the flood risk mitigation plans that the developers had submitted in the original planning application. As a result, residential development within the functional floodplain was approved. The flood risk measures taken were partly structural, such as flood storage provided by an undercroft car park and improved flood defences. Other measures were non-structural, such as flood awareness, flood warnings and flood insurance.

The EA stated that they were still unhappy with the decision. One EA officer emphasised that some issues with FRM had not been resolved; for instance, the fact that they were not able to provide a flood risk warning more than three hours in advance. He feared that if the site floods it would cause chaos (EA Officer D 2012, interview). Another officer was grateful that the inspector agreed with the majority of their issues:

> If the inspector had said: 'I do not agree with you on the application sequential test or the definition of functional floodplain', that could have had far wider consequences. Because of the fact that he said: 'I accept all your arguments, however there is a real economic and social driver in terms of the cricket ground, in that case I feel that those things outweigh the flood risk', it does not set the same precedent as it could have done. We are obviously really disappointed not to get that decision but that is the way the process works.
>
> (EA Officer E 2012, interview)

The flood risk consultants believed that common sense prevailed, but thought that the process to get there was unnecessarily long-winded and expensive:

> It was not necessary, because it was clear at the outset that this could be made safe. This unnecessary preoccupation with concentrating on specific wording, irrespective of the practical or pragmatic aspects of the development and flood risk issues, is just not helpful.
>
> (Consultant B 2012, interview)

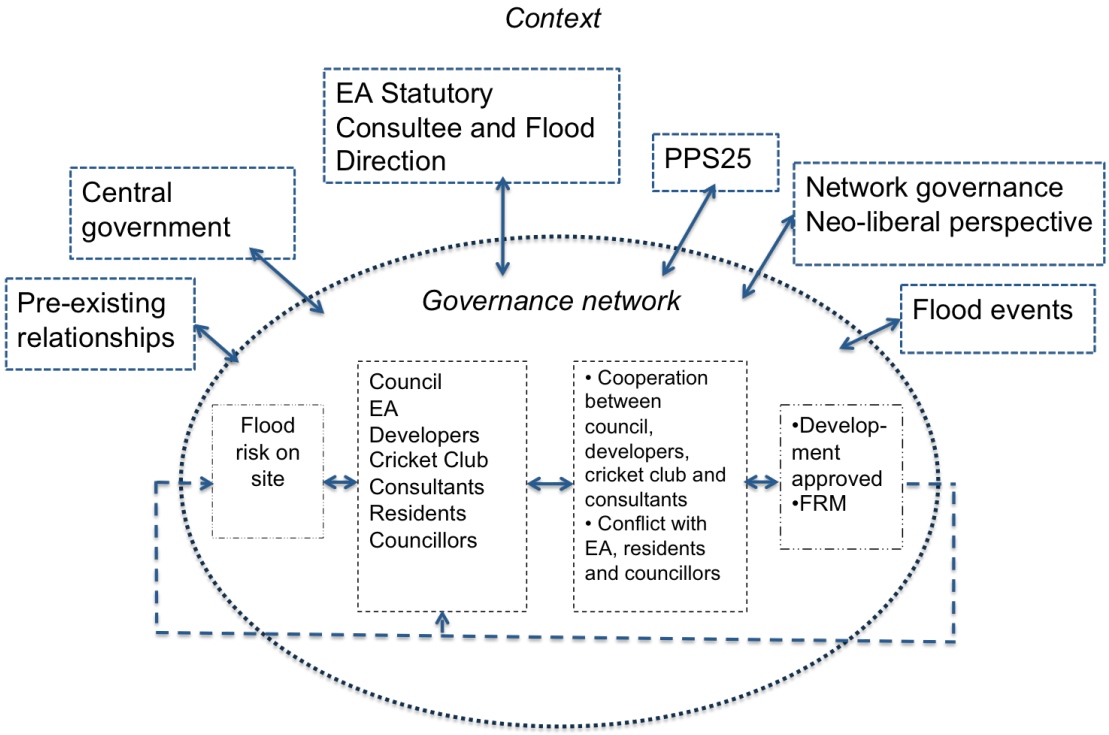

Figure 32: Functioning of governance network of cricket ground development

Through the approval of this development, the economic and social benefits of the cricket club remaining in Chelmsford's town centre have outweighed the principle of developing within a functional floodplain. CBC, the cricket club and the developers have been able to achieve their interests, but the interests of the EA have not been met. Some officers feel that a future flood could be costly in terms of damage and potentially harmful to residents' wellbeing.

7.4 Key factors that influence flood risk management

The case studies show that decisions on FRM have been taken in governance networks. The shift from government to governance and neo-liberal governmentalities have caused a plurality of actors to become involved in FRM, from the public, private, semi-public and community sectors. The main actors were planning officers, the EA, developers, residents and councillors. These actors interacted together in a network arrangement; they had some discretion in making decisions on FRM, within limits produced by hierarchical and market arrangements. Therefore, the nature of network governance influences FRM. This section further discusses the specific key factors within network governance that have influenced FRM.

7.4.1 Formation of the governance network

The governance networks from both case studies started voluntarily and became larger through time through informal and formal consultation. Two influential actors, including an officer from the EA who wanted to integrate development and FRM, formed the NGP network. The council and the applicants formed the cricket ground development network voluntarily with the aim of bringing forward development. The EA were involved at a later stage as part of the consultation process. Some literature suggests that early involvement of actors stimulates joint decision making and prevents their making use of the power of veto (Edelenbos and Klijn 2005); therefore, it may be that the earlier the EA become part of a governance network, the more likely that there will be cooperation and an agreed outcome, thereby preventing the referral of the application to the SoS. This would suggest that the formation of the governance network is a key factor that influences FRM, but on the other hand, this formation may also be influenced by other elements such as pre-existing relationships and actor characteristics.

The community was involved formally and informally. In both cases, the community felt that the management of flood risk was inadequate. In particular, they felt they could not trust developers and other private actors to manage flood risk sufficiently, because their main interest was to make a profit. Furthermore, residents in and around NGP were distrustful of the council, the EA and the WaSC, partly because flood risks were adjusted several times. The community's perceptions of flood risk were also strongly linked to flood experience and they did not have direct access to flood risk information.

Instead, they had to rely on other actors to inform them. In the cricket ground development, the residents trusted the EA to manage flood risk, but they criticised the council for not managing flood risk sufficiently.

7.4.2 Hierarchical influence

Hierarchical influence differs in each case: it was low in NGP, as there was a lack of regulations and policies regarding SuDS, but high in the cricket ground development. The existence of formal institutions such as the Flooding Direction enabled the EA to use this resource and to exert power, which meant that decision making in the network was blocked. As a result, the application was referred to and decided by central government. The actors also disagreed on how to interpret flood risk policy, for instance on the definition of a functional floodplain and the requirements for conducting an exception test. This showed that policy was open to interpretation, which the actors could use to argue for their preferred outcome.

7.4.3 Market influence

Within the governance networks, strong market influences were present. Developers had a significant influence on FRM by adapting the flood risk measures to their interests and, in the cricket ground development, also by producing knowledge that differed from the EA. However, in NGP this desired outcome was compatible with the preferences of the other key actors, whilst in the cricket ground development the EA's stance was incompatible with the applicants' development aspirations.

In NGP, the strong market influence, combined with the lack of a supporting framework for SuDS and limited public funding, meant that a private company became responsible for maintaining the SuDS. This is in line with a neo-liberal perspective. The management company is not democratically accountable, but the SuDS serve an important public purpose inside and outside NGP. This conflict between public purpose and private responsibility may cause conflicts in the future.

7.4.4 Actor characteristics

The actors' perceptions, preferences and resources differed in each network, which influenced interaction, because the more orientations differ, the more difficult

interaction between actors becomes (Scharpf 1994). A governance network has opportunities to realign preferences if the actors work together to do so, but this requires a good working relationship, such as in NGP. In this case, there were problems with implementing FRM, distribution costs and responsibility, but the actors were able to overcome these. Even though there were some conflicts between actors, overall they were able to sustain the network and achieve an outcome. In the cricket ground development, the relationship between the EA and the flood risk consultants was already strained from previous experiences and their interaction was conflicted. They were unable to align their preferences and failed to reach an outcome.

Therefore, the actors' perceptions are a key factor. In NGP, the actors had compatible perceptions of flood risk and FRM, as they all supported the use of SuDS. In the cricket ground development, the actors did not agree on their perception of flood risk, because there was a conflict of power between the EA and the consultants in calculating flood risks. In addition, there was a crucial difference in perception of the ability to balance flood risk and development. The actors were unable to realign their perceptions and the network failed to make a decision.

7.4.5 Knowledge as a resource

Knowledge is an important resource in FRM governance networks. Knowledge on flood risk is strongly linked to flood events; a flood event can heighten the flood risk for an area, which then influences FRM. Uncertainty of knowledge also plays an important role. In both case studies, actors found that calculating flood risk was not an exact science. Many assumptions have to be made and knowledge can change after new research is conducted into climate change, or after more detailed or reliable information on local circumstances, such as ground levels, is produced.

Actors can use this uncertainty to contest the information from other actors, and to produce knowledge that aids in achieving their interests. Actors can therefore use knowledge to exert power. For example, in the cricket ground development the applicants challenged the EA's models and calculations. Their flood risk information supported their preferences to develop, but central government trusted the information they provided. Therefore, they were successful in contesting the EA's flood risk information.

7.4.6 Flood events

Another important influence was flood events in the local area, which affected knowledge and perceptions. In both case studies, flooding had occurred in the past and the local authority and the EA were aware it was an issue for the new development. Simultaneously, flood events provided the EA with more information on flood risk, which meant that flood risk levels had to be increased. In addition, flood experiences by residents increased the involvement of the community in the planning process. Residents of areas near to the planned development were concerned that their flood risk might increase as a result of the new scheme. However, the community also used flood events as a way to exert power over other actors, in an attempt to achieve their aim of influencing the development.

Richards' research findings (2005) showed that flood experience increases the number of stakeholders involved in the planning process. In the case studies in this research, flood experience seemed to activate community involvement. At the same time, there was no relationship between flood experience and development in flood risk areas, as NGP was planned outside the floodplain and the cricket ground development inside. This may be explained by the third factor Richards mentioned, which is development pressure. Both cases had development pressure, but NGP had the space to leave the floodplains undeveloped, whilst in Chelmsford much of the town centre was located within flood zones.

7.4.7 The influence of agency

Agency has been an important influence in the governance networks. In NGP, the planning officer and the EA officer used their individual skills and their authority to persuade the developers to adopt SuDS. They preferred the most sustainable form of drainage, but did not have the resources and power to achieve this. Instead, the developers were able to realise their preferred solution, which did not interfere with their interests. Therefore, as the actors' preferences aligned, their interaction was positive and cooperative. They were able to harmonise their interests into a common goal and worked together to solve any issues. Even though there was a lack of structure to achieve their goals, they were able to contribute to creating a new structure for the development of SuDS in England. They did, however, affirm the neo-liberal structure through the creation of a private management company paid for by residents. This has

not been in the interest of the residents, but residents did not have the power to stop this decision. Instead, they are using their agency to organise themselves into a residents' association and achieve more transparency.

In the cricket ground development, agency has been a crucial factor as well. Even though PPS25 indicated that this development would not be allowed, the actors involved used their agency to push the development forward. The EA used all the power they had, derived from legislation, to try to stop the development, but they were overruled. The influence of agency in rejecting structures meant that some actors found the process unfair. These actors attempted to use their agency to stop the development, but did not have the power to make the ultimate decision, which was made by a central government actor.

7.4.8 The relationship between structure and agency

The decision-making process was influenced by both structure and agency. Structures that were in place needed to be taken up by agents in order to influence decision making. This occurred to achieve a common or an individual goal, thereby creating cooperation or conflict. In addition, structures were purposely rejected in order to achieve a goal. Moreover, if there was a lack of structure, actors were able to find solutions or help to create new structures. It is impossible to separate the influence of structure from the influence of agency, which supports theories such as structuration theory by Giddens (1984) or approaches to studying networks such as by Marsh and Smith (2000).

7.4.9 Influence of outcome

Lastly, there is a feedback loop from the governance network outcome to the actors and the wider context. In NGP, actors learned a significant amount about how to implement SuDS. This not only influenced FRM in the later stages of the project, but their experiences also helped other projects and the formation of regulations and guidance on SuDS. In Chelmsford, there were concerns that approval would set a precedent of developing within floodplains. In addition, after the EA experienced that national actors prioritise development, they now compromise on this core principle. They have changed their stance and are now seen as more cooperative and less inclined to sustain objections that lead to public inquiries. Lastly, some residents have lost trust in the council to make

fair decisions on development, whilst others have lost faith in the council, the EA and the WaSC to manage flood risk sufficiently.

7.5 The governance debate in the light of the findings

Some of the issues addressed in the governance debate in Chapter 2 have also been part of the governance networks studied in this research. Firstly, this research has shown that there has been a shift from government to governance in FRM and decisions are now made within governance networks. However, this shift does not mean the influences of hierarchy and market are absent. Rather, governance of FRM is a hybrid form, in which central government directly and indirectly affects the network and the private sector is able to influence the outcome of FRM.

The governance of FRM is a Type II multi-level governance. According to Hooghe and Marks (2003, 2010), this type of governance has a large number of authorities who operate at diverse territorial scales and whose jurisdictions are functionally specific. For instance, in NGP a multitude of actors shared responsibility for FRM, such as the local authority, the EA, the developers, the WaSC and the airport. The authorities' jurisdictions in the Type II multi-level governance are intended to be flexible, adapting to changing citizen preferences and functional requirements. However, in FRM this flexibility is undermined by hierarchical rule. Central government influences some of the authorities with specific FRM tasks, whilst it also sets regulations that limit the behaviour of others. For example, in NGP the WaSC was unable to adopt SuDS as this was contrary to the Water Industry Act 1991, which the WaSC has to adhere to. The authorities are, therefore, bound by the institutional framework and cannot easily adapt to changing preferences or situations. In addition, Hooghe and Marks describe that in this type of governance, residents are not served by 'the' government, but by a variety of authorities. The case studies have shown that this can affect residents' trust in authorities. For example, amongst residents living in and near NGP there was confusion about which authority was responsible for FRM and they were uncertain if flood risk was managed sufficiently. Attempts by the authorities to inform residents of the causes of flood risk and the effectiveness of flood risk measures were not completely successful. In short, the disadvantage of Type II governance is that it may be a barrier to effective FRM.

In order to analyse the functioning of governance networks, Marsh and Smith's dialectical model (2000) can be applied. Even though it examines the roles networks play in policy development and implementation, as opposed to networks being treated as a new form of governance, it can be adapted. By including a key factor, which is the type of governance that shapes the formation and the functioning, the model can be applied to examine governance networks. The type of governance is identified by using concepts from multi-level governance (Hooghe and Marks 2003, 2010), Foucault's governmentality (e.g. Foucault et al. 1988) and research on hybrid forms of governance (e.g. Scharpf 1994, Jessop 1999, Whitehead 2003, Bache and Flinders 2004, Swyngedouw 2005, Grix and Phillpots 2011, Klijn and Koppenjan 2012).

In addition, the dialectical model's relationships between the structure of the network and the agents, between the network and the context within which it operates and between the network and the policy outcome can be applied. For instance, the relationship between the structure of the network and the agents was visible in both case studies. NGP's governance network was considered successful by the actors, as there was cooperation and an agreed outcome was implemented. This confirms research by Healey (1998), Toke and Marsh (2003) and Edelenbos et al. (2013), in which strong and resilient governance network structures create a high level of institutional capacity and develop formal and informal rules for interaction. As a consequence, actors trust each other, share information and knowledge and are able to take joint action, resulting in an agreed outcome. For example, in NGP actors worked together and, as a result, were able to include SuDS into the development. This outcome would not have been feasible without mutual cooperation and the exchange of resources.

However, governance networks may also experience much conflict and fail to reach agreements. Actors distrust each other and any behaviour is perceived by others to be a promotion of self-interest or purposely adversarial. This was evident in the cricket ground case, where there was much conflict between the EA and the flood risk consultants working for the developers. The EA found that the consultants were intentionally adapting flood risk calculations to enable development, whilst the consultant found that the EA was uncooperative and not pragmatic. The two actors did not trust each other's intentions and were unwilling to make concessions. When there is distrust in a network, no institutional capacity is created (Healey 1998).

An explanation of the failure of the governance network may be found in Scharpf's statement that the more orientations differ, the more difficult interaction between actors becomes (Scharpf 1997). Actors are unwilling to adjust their orientations as they find that network failure would be a better result for their interests than reaching a compromised outcome. Scharpf's statement can also be applied to community involvement. In the case of FRM, residents may be concerned that a development will exacerbate their flood risk, causing the interaction between these residents and the FRM authorities to be conflicted. Authorities directly involved in FRM often share the same FRM knowledge, but residents do not have access to this. In addition, they lack the expertise to understand or calculate flood risks and depend on the authorities to relay the information, which they may distrust. Moreover, they are heavily influenced by their own experience of flooding, which is often a stressful and emotional situation that the authorities do not share. As a result, a tension between the 'facts' and the 'feelings' of flood risk arises.

Applying network management or meta-governance may solve a situation of conflict. For instance, FRM authorities may attempt to solve the conflicted situation between them and residents by changing the residents' perceptions. This is an example of network structuring (Klijn et al. 1995). The NGP case showed that FRM authorities increased interaction with residents and shared information and knowledge in order to create understanding about the causes of flooding. In the cricket ground case, central government applied process management. When decision making was referred to central government, a mediator was appointed who tried to resolve the conflict between the actors, but the attempt was unsuccessful.

The other two relations from Marsh and Smith's dialectical model (2000) were also observed in this research. The relationship between the network and the context within which it operates is visible in how the actors address structures and changes in the context. Structures exist independently from the actors, but only become relevant when acknowledged by them. The research has shown examples of actors using or challenging structures to achieve their interest or trying to create new ones. The relationship between the governance network and the policy outcome was also clear: the characteristics of the actors affected their interactions, which in turn affected the outcome of FRM. This research therefore confirms the mutual influence of structure and agency.

Furthermore, understanding was gained of how the governance networks addressed a wicked problem. The actors in the governance networks were uncertain about the nature of the problem; there were discrepancies between some of the actors' definitions of the problem; there was no true solution available; and decisions were taken within various policy fields and governmental levels. However, the governance networks also showed that another factor was important as identified by Koppenjan and Klijn (2004): the actors' strategic choices, causing strategic uncertainty that influenced the problem-solving process. Actors responded to uncertainty by collecting more information and conducting more research. However, some actors were exploiting the uncertainty to achieve their own goals. Therefore, actors in governance networks may increase the wickedness of a problem out of self-interest. On the other hand, governance networks may also be effective in dealing with wicked problems. Actors may create innovative solutions and adjust to any conflicts or complexities that occur during the process (Agranoff and McGuire 2001, Parker 2007, Sørensen and Torfing 2007, Brownill and Carpenter 2009, Klijn et al. 2010a). How well a governance network is able to address a wicked problem seems related to the institutional capacity of that network. The higher this capacity, the more able actors are to overcome problems.

Finally, this research has also shown how power is exercised in governance networks. The first dimension of power according to Lukes (2005, Hayward and Lukes 2008), comprises an observable form of power, which actors derive from resources, such as financial resources or knowledge. In the cases, these resources and power were dispersed amongst actors, with mainly the local planning authority, the EA and developers holding important resources used in negotiation. The influence of private developers using financial resources to exert power showed the influence of the free market in FRM and planning. This research has also shown that actors actively attempted to reduce the power of other actors. For instance, an important resource of the EA was their expertise and knowledge, but the developers, by creating their own knowledge, which was approved by government as being reliable, were able to reduce the power of the EA.

The second dimension of power comprises influence over the governance network structure, the agenda and the rules. In the cases, central government had significant power in this dimension, by setting enforceable regulations and policies. Some of these rules provided central government with the power to decide on applications referred through the Flooding Direction; this power was observable in the first dimension. Some

of these rules also provided the EA with resources to exert power over others. In addition, local government had the power to control participation and set the agenda to some extent, which was part of the second dimension of power. Other actors who observed this power found that the decision-making process was unfair and to their disadvantage.

The third dimension of power is hidden from direct observation and is difficult to identify. In governance networks, actors are interdependent and their behaviour is partly influenced by the power of other actors, even if it is not exerted. In addition, the third dimension of power is part of the governance of governance, where each outcome that is in harmony with the governmentality strengthens it. This type of power has been discussed by Foucault (for instance 1991).[50] In the case of FRM, if governance networks decide that the benefits of development outweigh the costs and the principle of developing in a flood zone, the perceptions and preferences of all actors may be affected. For instance, actors may perceive development pressure to be a priority and development in flood risk zones may become the norm. Residents of new developments may then accept that they need to live with flood risk and be resilient. Furthermore, this research has shown that the EA has now changed their strategy within governance networks by reducing their sustained objections under pressure from a central government that is in favour of sustainable development. In this way, central government has the power to influence perceptions and preferences on the role of FRM in sustainable development.

Therefore, by examining power in three dimensions, the power relationships between actors become visible. Power in the first dimension may seem fairly equally distributed and government seems an equal actor amongst others, as stated by Jessop (1999). However, when power in the second and third dimensions is included, the underlying hierarchical power structure becomes visible and asymmetrical network governance can be identified, as argued by Grix and Phillpots (2011).

7.6 Conclusion

This chapter analysed the data collected from two case studies by applying the theoretical framework. As a result, the key factors that influenced FRM were identified, which are derived from both structure and agency. These factors are: formation of the

[50] See sections 2.2.3 and 2.4.3.

governance network, hierarchical and market influence, actor characteristics, knowledge, flood events, and agency. In addition, the relationship between structure and agency is a key factor. Moreover, the outcomes of the networks are expected to influence future decision making on FRM.

Firstly, the formation of a governance network is an important factor: in particular, which actors are involved and whether the network is formed voluntarily or through mandate. For example, if the EA are voluntarily involved in the early stages of the decision-making process, cooperation may be stimulated. The EA's sole interest is to manage flood risk, which may conflict with other interests, and in addition, they hold veto power.

Secondly, various structures influenced FRM, such as flood events that changed the governance network through interests, perceptions, preferences and resources. For instance, they contributed to knowledge development. However, flood risk is a wicked problem, with much uncertainty, which can cause problems within networks. In NGP, actors dealt with this uncertainty together, whilst in the cricket ground development, actors used this uncertainty to exert power. Furthermore, private developers had much influence in FRM. They were responsible for assessing and mitigating flood risk on site, with the council and the EA overseeing the process. Even though safety had priority, in both cases FRM was adapted to suit the development.

Thirdly, agents, and in particular, individuals, played an important role. In NGP, the involvement of a different EA officer or planning officer might have resulted in a different FRM outcome. In the cricket ground development, agents used their resources to force decisions to be made that were close to their preferred outcomes: the council by using their decision-making power; the cricket club by stating they would leave their current location if they were not allowed to develop; the developers by developing knowledge to overcome the barrier of flood risk; the EA by using their power to refer an application; and the residents by organising themselves into a Local Residents' Group. Moreover, the involvement of particular individuals may have exacerbated the conflict between the EA and the flood risk consultants, who were unable to negotiate a shared outcome.

Fourthly, the case studies showed that agents affirmed, rejected and developed structures to achieve a common or individual goal. Most structures, such as flood events, existed independently from the actors. However, it was only the actors' changes

in behaviour that caused these structures to become relevant. Therefore, the influences of structure and agency are inseparable.

Finally, the outcomes of the governance networks have influenced the actors and FRM in general. Some of the actors have learned to adapt their behaviour within other governance networks, such as those who expect cooperation or conflict from other actors, thereby adapting their behaviour in anticipation when they encounter these actors in other networks. In addition, the outcomes of FRM have set examples in England; for instance, through promoting the use of SuDS, or by addressing the conflict between development pressure and flood risk.

Chapter 8 Conclusion

8.1 Introduction

This chapter concludes the thesis. Section 8.2 addresses the research questions and section 8.3 explains the contribution this thesis has made to research. This is followed by the limitations of the research in section 8.4. Finally, section 8.5 makes recommendations for future research.

8.2 Addressing the research questions

The overarching aim of this research was to explore the nature of network governance in FRM in local planning processes in England and its influence on the outcome of FRM. This was addressed by focusing on three questions as follows:

1) How has network governance of FRM developed?

Chapter 3 described developments in the governance system of FRM. In the past, FRM was the responsibility of regional water authorities funded by central government, with little influence from local authorities. This hierarchical system gradually changed over time. As a result, the provision of water and sewerage was transferred to the private sector, national FRM became the responsibility of a non-departmental public body (NDPB) and local authorities became responsible for local FRM. In addition, funding for FRM measures has changed. Central government has an agreement with private insurance companies, so that households can take out and pay for flood risk insurance to cover flood damage. Central government also attracts private investment to fund flood defence measures and allows communities take control of local FRM by providing funding. Individuals and communities are therefore encouraged to live with flood risk and to take their own measures to manage this risk.

Moreover, FRM was traditionally aimed at controlling floods by implementing structural measures, but from the 1990s onwards, the focus shifted to managing flood risk by a combination of measures. Growing environmental awareness and understanding of the effects of climate change meant that FRM was now aimed at accepting flood risk, but managing the probability and the consequences of flooding using structural and non-structural measures. In addition, flood events created a sense of

urgency to change the institutional setting of FRM. For instance, after the 2007 floods in England, the Pitt Review identified the need for change, resulting in the Flood and Water Management Act 2010. Through this Act, local authorities gained responsibility for all sources of local flooding and in the near future, the number of statutory consultees involved in drainage issues will be increased. As a result, the governance of FRM is a Type II governance, in which responsibility and accountability is dispersed amongst multiple authorities on various spatial levels (Hooghe and Marks 2003, 2010). This means that network arrangements play an important role, but simultaneously, hierarchical and market influences are present as well, resulting in a hybrid governance system.

Moreover, planning became an important part of FRM as a non-structural measure. The inclusion of planning in FRM through the formal institutional framework started with a government circular released in 1947, stimulating interaction between planning and water authorities. Over the years, further circulars were released, but their implementation was limited. FRM became more important by its inclusion in PPG, later followed by PPSs and the NPPF. In addition, the EA gained more influence in the planning process by becoming a statutory consultee and by the introduction of the Flooding Direction. As a consequence, important decisions on FRM now take place within the planning system. The planning system has also experienced a shift from government to a hybrid form of governance. Public, semi-public and private actors are involved in the planning process, with central government currently increasing the role of the market and the community.

In conclusion, the shift towards network governance in FRM has taken place within the FRM field itself and within the planning system of which it has increasingly become part. Multiple actors are involved in planning for FRM, who make decisions within governance networks. These governance networks have the key characteristics mentioned by Sørensen and Torfing (2007, 2009). Firstly, the networks are relatively stable, as the same composite actors and in some cases, the same individual actors are responsible for making decisions on FRM. The actors are operationally autonomous, but are dependent on each other to make decisions on FRM, because responsibilities and resources are dispersed. Secondly, the actors are from the public, semi-public and private sectors and from civil society. Thirdly, the actors interact through negotiations; this research has shown that often actors make concessions to meet each other's interests, in order to achieve an agreed outcome. Fourthly, the governance network

operates within a formal and informal institutional framework. Fifthly, the network is self-regulating within limits set by external agencies, such as policies and regulations set by central government that govern the governance. Additionally, decisions are taken at a distance from central government; however, it retains the power to take over decision making under certain conditions. Finally, the network contributes to the production of public purpose, which is the management of flood risk.

2) How do governance networks in FRM function?

This question was divided into five sub-questions. These sub-questions all contained elements from the theoretical framework developed in this thesis.

2a) How do governance networks in FRM form?

Chapter 3 explained the development of network governance in FRM, which also covered the formation of governance networks in FRM. Governance networks can be formed for a variety of reasons: as a response to an urgent flood issue, voluntarily, or as a result of direct or indirect governmental direction. This research showed that governance networks were formed in stages and for a variety of reasons. At first, a small network was formed voluntarily, after which the network expanded. This expansion was at times voluntary but mostly through mandate, by the inclusion of statutory consultees in the planning process.

For example, in the case of NGP, the network formed between the local planning authority and the EA. Later, the developers joined the network, in order to discuss development options and the WaSC became part of the network to discuss drainage issues. Councillors and residents became part of the network, not only through mandate, but also as part of a committee the local authority had created to discuss NGP and through informal consultation. In the case of the cricket ground, the network was formed voluntarily between the local planning authority and the cricket club. Later, the developers joined the network to discuss development options. Consultants became part of the network by working for the cricket club and developers on planning and flood risk issues. The EA, residents and councillors joined the network as part of the formal planning process through mandate.

2b) What actors are present?

Chapter 3 identified a large group of key actors who may become involved in governance networks, from a variety of spatial levels and sectors. These actors have complex interrelationships within and outside governance networks. The issues the governance network addresses influences the involvement of actors, as different actors have different responsibilities and interests and operate on various spatial levels.

Firstly, there are governmental actors on various spatial levels who develop regulations and policies on FRM. The EU produces directives, which state members have to transpose into national regulations. Central government develops these transposed regulations and also any additional regulations on FRM. In addition, Defra formulates FRM policy, provides funding and oversees the Environment Agency, whilst DCLG forms planning policy that affects FRM. The Secretary of State (SoS) is another influence on FRM, as he or she decides on planning applications that have been called in. On the local level, local government is responsible for local flood risk. It produces policies and plans aimed at managing flood risk and it is the decision maker for most planning applications. Local councillors are also involved in the planning process.

Government does not hold all responsibility, as some outside agencies also have FRM functions. The Environment Agency, an NDPB, has the national strategic overview of flood risk, whilst private water and sewerage companies are responsible for the functioning of foul and surface water sewers. In some areas, Internal Drainage Boards oversee the drainage of land. Others, such as highway authorities, navigation authorities, emergency services and the Marine Management Organisation also manage flood risk as part of their specific responsibility.

As flood damages to properties and businesses are covered by private insurance, insurance companies also play an important role in FRM. They have an interest in the reduction of flood risks and they therefore regularly interact with the government on this issue. Another national actor is CIRIA, who develops guidance for the construction sector and has produced guidance on implementing sustainable drainage.

Finally, on the local level, developers are responsible for assessing and managing flood risk in a development and are therefore able to influence the way flood risk is managed. The community also has a great interest in issues with flood risk. Not only are some directly affected by flooding, they are now also offered the opportunity to develop flood

risk measures with government funding. Communities are supported by a national charity that aims to reduce the consequences of flood risk, called the National Flood Forum.

As mentioned, the involvement of these different actors depends on the issue within the governance network. The two case studies showed that in the planning process for new development in England, the key actors involved are the local planning authority, the EA, developers, flood risk consultants, councillors and the community. In some cases, central government becomes involved, as well as other actors with an interest in FRM such as WaSCs and airports.

2c) What are the characteristics of these actors (e.g. roles, responsibilities, interests, resources, perceptions and preferences)?

Chapter 3 described some of the characteristics of the actors, but more detail on this was produced through the case studies. Firstly, the local authority has an interest in sustainable development, of which FRM is a part. The perception of flood risk differs by local authority, and is, for an important part, derived from their local policies. Resources differ by local authority as well. For instance, some authorities have flood risk experts in their planning department, which means they are better able to understand the technical language of flood risk and may be more able to influence FRM within development.

Secondly, the EA's interest is to manage flood risk, and they have great expertise in doing so. Their singular interest can conflict with the planning authority's wider sustainability goals and with the developer's interest in development. They have much expertise in and knowledge of flood risk, but developers may challenge this.

Thirdly, the developers' interest is to make profit by developing and they have the financial resources to do so. At the same time, they have to assess and manage flood risk. As flood risk calculations and models have a degree of uncertainty, they may attempt to challenge the flood risk calculations by the EA to achieve their interest. The government does not consider the EA as the only provider of reliable information and may accept alternative calculations from developers.

Fourthly, the community is involved in the planning process: on some occasions the local authority invites them and on others they are part of mandated consultation. In some cases, councillors are directly involved in the decision-making process, whilst

others are part of the planning committee or are objecting to a particular scheme. If they are involved in the process, they share the same information and knowledge as the other actors involved, meaning their perception of flood risk is largely the same. However, when the councillors and the community are not directly involved, they do not share this knowledge. If a flood event occurs in their local area, their perception depends heavily on their flood experience. This research showed that residents are often concerned about new development exacerbating their flood risk and that these concerns are very persistent. They often mistrust other actors to effectively manage flood risk, such as the local authority and the WaSC, but mostly the developers.

Fifthly, the WaSC becomes involved if underground drainage systems are involved in FRM. They support the development of sustainable forms of drainage, as this reduces pressure on the sewerage, but they are legally unable to adopt any features that are not underground pipes or tanks, whilst they also have to justify any investment to Ofwat. Therefore, their resources are limited.

Finally, central government becomes involved if an application is referred and called in. This research has shown that this may occur if the EA sustains its objection to an application. If the application is discussed in a public inquiry and decided upon by the SoS, it is the SoS's interest to follow national planning policy, which currently has a presumption in favour of sustainable development.

2d) How do actors interact?

Actors in governance networks meet formally and informally. They negotiate on development and FRM and go through processes of cooperation and conflict. At times, they are able to overcome conflict and to negotiate any issues, but at other times the network fails. The interaction is dependent on the actors' characteristics and the network structure; for instance, actors that are able to align their perceptions and preferences, cooperate and combine their resources to reach an outcome. This cooperation creates a network structure with a high level of institutional capacity. However, if actors' perceptions and preferences diverge, conflict may arise and the network structure will not enable fruitful negotiation. In addition, the wider context may influence interaction.

2e) How do the wider context and the governance network interact?

Chapter 3 and the case studies showed that there are various structures and agents present in wider context that may affect the governance network:

- *Formal institutions:* the governance network has to comply with regulations and policies on FRM. The lack of regulations can cause barriers to FRM, for instance on adoption and responsibility of SuDS. The presence of regulations can also be a barrier to some actors; for instance, the Flooding Direction is an important resource for the EA to achieve their goals, but can be a frustrating delay for the developer. In addition, policies may be open to interpretation, such as the weight of FRM policies versus planning policies on stimulating development. The actors can choose to affirm or reject formal structures, based on their preference. For instance, the lack of regulations can be overcome by making agreements amongst each other, whilst actors can also use ambiguity in policies to argue their case.
- *Government and policy change*: development in government and policy means that the governance network has to adapt to new formal institutions or a new central government actor.
- *Climate change*: central government and the EA are producing scientific evidence of the effects of climate change, whilst central government incorporates climate change into policies on FRM. Furthermore, climate change increases the uncertainty of flood risk. Local actors may have difficulty understanding the precise impacts of climate change in their local area. Translating the results of research conducted on climate change to a local area is complicated and there is much uncertainty involved. In addition, climate change effects are not easily measured, because individual weather events cannot be attributed to climate change.
- *Flood events:* flooding has an important influence on governance networks in FRM. Firstly, it can affect actor participation. A flood event in the area of a proposed development causes a flood risk issue, which means more actors become involved, such as the EA and residents. Secondly, a flood event can change the characteristics of actors. It may increase the awareness and alter perceptions of flood risk, increasing the priority of FRM. It may also increase knowledge of flood risk, influencing FRM. Lastly, a national flood event may change the institutional framework of FRM, which affects the responsibilities,

roles and resources of actors. For example, the 2007 floods in England initiated the publication of the Pitt Review and the creation of the Flood and Water Management Act 2010. One of the results of the new Act was the establishment of Local Lead Flood Authorities,[51] which became responsible for managing local flood risk.

- *Economic situation:* the importance of development due to a recession or development pressure may outweigh the principle and cost of building in areas of flood risk. This research showed that in some cases the economic benefits of development are considered more important than FRM policy that prohibits residential development in floodplains, such as in the cricket ground development.
- *Governance:* the governance system of FRM influences which actors are involved in the governance network and their roles, responsibilities and resources. Network governance arrangements play an important role, but these arrangements include hierarchical and market influences. Actors involved are from the public, semi-public and private sectors and from civil society, but responsibility, accountability and authority are fragmented. For instance, in the NGP case, there were issues with which authority would take on the responsibility for the adoption and maintenance of the SuDS. As a result, responsibility was divided: the local authority adopted the SuDS ponds, but a private management company established by the developers became responsible for their maintenance.

3) What are the key factors in network governance that influence FRM?

This research has shown that a variety of key factors, derived from the influence of structure and agency, have an effect on FRM. The first key factor is the type of network governance in FRM. There is a multitude of actors with varying roles and responsibilities in managing flood risk, who interact within the governance networks. At times, problems are caused over responsibilities for FRM or when interests conflict. In addition, governance networks have some discretion, but are influenced by the strategic line and the dominant governmentality. Central government issues regulations and policies, which governance networks are expected to comply with. Therefore, central government is able to exert power over actors. This power is not always directly observable, but may take place as part of the governance of governance. The private

[51] These are county councils or unitary authorities.

sector also plays an important role in the networks through the influence of developers. The resulting governance system is, therefore, hybrid with influences from networks, hierarchy and the market.

Secondly, actor characteristics play an important role; not just the characteristics of the composite actor, but also individual traits. In particular, an actor's perception is an important factor. Perceptions shape the actor's definition of the policy problem, what type of outcome they can visualise and how they see other actors. Some actors' perceptions are centred on development, whilst others focus on FRM. If a perception allows for development and FRM to be combined, the actors can cooperate and the network can work towards an agreed outcome. As actors cooperate over a longer period of time and develop mutual trust, the network develops institutional capacity, which helps actors to overcome conflict. However, if actors cannot visualise an outcome they all agree on, or when they do not wish to cooperate with others, conflict arises. Actors are able to adjust their perceptions, but will not do so when they do not trust other actors. Examples are residents insisting on believing that development increases their flood risk, or the EA not accepting alternative flood risk calculations. As a result, a network may fail to reach a decision, in particular if the actor with the objection has veto power.

Perception is affected by various structures. An example is local planning policy for a local authority; if there is much emphasis on relieving development pressure in areas at risk of flooding, it is inclined to put greater weight on the benefits of development over the principle of building in flood zones. However, structures are not the only determinant; agency, such as individual skills and preferences, also matters. Individual actors can therefore influence FRM.

In addition, resources such as financial resources and knowledge are important parts of the actors' characteristics, which actors may use to exert power. Knowledge is dispersed amongst actors. Historically, the EA held the most expertise on flood risk, but now local authorities and flood risk consultants are developing their own knowledge. As flood risk predictions are open to interpretation, they may be manipulated to achieve a single interest and used to exert power over others.

Thirdly, a crucial factor is formed by flood events, which affects actor participation, perceptions and knowledge. A proposed development that is in an area with flood experience activates a governance network with actors who have an interest in FRM; in

particular, community involvement may be increased. Flood experience also alters actors' perceptions. On the one hand, it can increase the urgency of implementing FRM in a new development, stimulating cooperation between actors. On the other hand, it can increase concerns that development enhances the risk of flooding and that the flood risk measures planned are not sufficient, therefore creating conflict between actors. Lastly, flood events also change knowledge on flood risk, often increasing the flood risk in an area, which may affect FRM.

In conclusion, structures influence FRM, but each governance network exists in a specific temporal and spatial context, in which particular structures exist. The agents actively use these structures to achieve a collective or individual interest. They may affirm, reject or develop a structure. The agents also create the social structure of the governance network by institutionalised interaction. Agents also act within specific contexts, but have the ability to influence structures or use certain structures to influence other actors' behaviour. Therefore, both structure and agency influence the outcome of FRM.

8.3 Contribution to research

This research has firstly contributed to the debate on network governance by developing a theoretical framework for analysis. This framework built on research by Sørensen and Torfing (2007) who provided a definition of governance networks. Even though this definition provided guiding elements to examine decision making in governance networks, it did not explain how these elements interrelated. Therefore, the framework showed the relationships between these elements and explained how they may influence the outcome of the governance network. Furthermore, this research has also contributed to a second generation of network governance research by examining the functioning of governance networks in practice. The theoretical framework showed different key elements that may explain the functioning and outcome of a governance network. These factors comprise structures and agents, which are internal or external to the network. As a result, knowledge of the functioning of governance networks may be gained.

In addition, this research has shown that the dialectical model by Marsh and Smith (2000) can be applied to network governance research. By applying the dialectical relationships between the structure of the network and the agents, between the network and the context within which it operates and between the network and the policy

outcome, the key factors that influence the outcome became clear. However, the model needed to be adapted to become suitable for analysing governance networks, for instance by including the influence of governance in the wider context. This resulted in the theoretical framework.

Furthermore, this thesis has contributed to the debate on hybrid forms of governance, which include the influence of networks, hierarchy and the market (e.g. Scharpf 1994, Whitehead 2003, Bache and Flinders 2004, Swyngedouw 2005, Grix and Phillpots 2011, Klijn and Koppenjan 2012). This thesis has also added to research on specific cases on hybrid forms of governance (e.g. Skelcher 2000, Laffin 2009). In the shift from government to governance, central government has retained some of its power and is able to directly and indirectly affect governance networks. Some forms of power are difficult to observe, in particular the power that is present in the third dimension (Lukes 2005) and as part of the governmentality (e.g. Foucault et al. 1988). The theoretical framework enables the identification of all three dimensions of power through the relationships between the actors within the network and the relationship between the network and the wider environment. Moreover, this thesis provided examples of Type II multi-level governance (Hooghe and Marks 2003, 2010), in which responsibility for FRM is fragmented, but it has shown that this type of governance is not as flexible as Hooghe and Marks suggest.

This research has also contributed to FRM research. It confirms some findings of past research by Tunstall et al. (2009), which showed that actors in FRM may have diverging perceptions and definitions of flood risk. This research has expanded on this by examining the decision-making process in detail and finding explanations for these different perceptions and the influence this has on the outcome of FRM. Moreover, this research confirms some of the research findings by Pardoe et al. (2011), such as that FRM is decided on a case-by-case basis and that the actors negotiate to solve the conflict between land, water and people. However, the process of negotiation is not always ‘sensible’ (Pardoe et al. 2011: 2900) and the actors are not always able to make compromises. Finally, the research also showed in more detail how certain structures influence FRM, including those identified by Richards (2005) as stakeholder practice, development pressure and flood experience. Therefore, it has contributed to knowledge on governance networks in FRM.

8.4 Limitations of the research

This research has examined two case studies, which means there are limitations to generalisation. There are some common key factors identified in both cases, which may also be applicable to other governance networks in FRM. However, each network is also completely different. The local situation, the period in which it took place and the presence of different individuals are only three of the factors that influence the network and the outcome. Both case studies do show the continuing conflict between development and FRM, which is not solved easily or uniformly.

An important limitation in data collection was the openness of participants. Even though participants were guaranteed anonymity, some participants might have still withheld information, especially on sensitive issues such as conflict between actors or within the organisation. In particular, planning officers might have been sensitive to this, as their participation in planning processes is publicly available. Despite these limitations, it has been possible to address the research questions with the data that was available.

Furthermore, as structures were of importance in the analysis, the researcher has had to judge which structures might have been influential and find a balance between a case becoming too narrow or too broad. As structures only exist within the temporal and spatial horizons of action pursued by actors, and actors always act within specific action contexts formed by institutions and the interaction of other social actors (Smith 2000, Jessop 2008), only structures that were relevant to the governance network and their related actors have been included. Documents and interviews were analysed and parallels between potential influential structures and agents were sought. National structures have only been included if this was found to be directly influential, such as a change in the SoS. As a consequence, all structures that mattered to the actors in the network were included.

8.5 Recommendations for further research

This research examined governance networks in FRM, which showed the various issues actors have to address when deciding on how to manage flood risk. FRM can at times be considered to be a barrier to development, however some of the solutions provided in the case studies were innovative and showed that it is possible to integrate the two. Even then, issues can arise with adoption, maintenance or responsibility of flood risk

measures. However, a governance network with a high degree of institutional capacity has much potential to find solutions to these problems.

This research has shown two contrasting governance networks. In one network, a group of actors worked together, overcame barriers, developed new structures and implemented innovative flood risk measures. In the other network, there was a strong conflict between development and flood risk and the actors were unable to come to an agreed solution. As a result, the outcomes of these two networks were very different. However, each network outcome influences how people live and how they experience flooding in the future. Therefore, it is important to consider how the role of FRM in sustainable development is defined.

Future research may therefore take place in the fields of network governance and FRM. Firstly, more understanding may be developed of the functioning of governance networks. The theoretical framework developed can be applied to future network governance research outside the FRM field, to test its suitability. By identifying key factors that influence governance network outcomes in other fields, understanding of the relationships between agents, structures and the wider context can develop. In particular, comparative research on successful and unsuccessful networks may explain how actors are able to develop institutional capacity. In that way, recommendations may be developed for actors in governance networks to stimulate cooperation and prevent network failure.

In addition, more research can be conducted on FRM governance networks. More understanding can be developed of decision making between actors involved in FRM and how they respond to the conflict between development and flood risk. Research may also be aimed at network management, to improve interaction in those cases where there is much conflict, or to investigate how to align residents' perceptions of flood risk with the perceptions of experts. Finally, research may focus on the outcomes of the governance networks that decide on FRM and the short- and long-term effects on the probability and consequences of flooding.

Appendices

Appendix A Key regulations on flood risk management and planning in England

This appendix provides the key regulations that are relevant to FRM and planning in England.[52] These are visualised in Figure 33.

European legislation

The main purpose of the EU Floods Directive of 2007 is to protect inland surface waters, coastal waters and groundwater; the management of floods and droughts is considered a sub-goal. The Directive was transposed into English law through the Flood Risk Regulations 2009. The Directive requires Preliminary Flood Risk Assessments to be published for river basin districts with the aim of identifying areas at significant risk of flooding. These were completed in 2011 by the Environment Agency (EA) for flooding from main rivers, the sea and reservoirs, and by Lead Local Flood Authorities (LLFAs) for local flood risk of ordinary watercourses, surface water and groundwater. For river basin districts at risk of flooding, flood hazard maps and flood risk maps were completed in December 2013, whilst FRM plans are due to be completed in 2015 (European Commission 2007).

The Water Framework Directive of 2000 focuses on water quality of groundwater and inland and coastal water in water basin districts. It also aims to prevent the deterioration and enhance the status of aquatic ecosystems (European Commission 2000, 2003). With regard to flood risk, the Directive states that it 'contributes to mitigating the effects of floods and droughts' (European Commission 2000: 5), but only if this affects water quality or the aquatic environment. For example, flood defence schemes, such as changes to floodplains, may adversely affect plants and fish (Davis and Cunningham 2004). In addition, if surface or sewer floodwaters spill into watercourses or infiltrate into groundwater, deterioration of water quality may occur. The Directive was transposed into English law through the Water Environment (Water Framework Directive) Regulations 2003 and the EA has become responsible for developing river basin management plans to comply with this Directive.

[52] As of December 2013.

National legislation

The Planning and Compulsory Purchase Act 2004 requires regional and local planning authorities to exercise their functions with the objective of contributing to the achievement of sustainable development.

The Land Drainage Act 1991 describes the Internal Drainage Boards (IDBs). These are independent bodies responsible for land drainage in areas of special drainage need. The Act states that IDBs, and local authorities where there is no IDB, may maintain or construct watercourses or drainage works on watercourses, apart from main rivers, to prevent flooding or mitigating any damage caused by flooding, as necessary.

The Environment Act 1995 describes the establishment of the EA, which took over functions such as flood defence from the National Rivers Authority. The objective of the EA is to protect or enhance the environment and to make a contribution towards sustainable development.

The Town and Country Planning (General Development Procedure) Order 1995, as amended in 2006, makes the EA a statutory consultee for developments where flood risk is an issue. This is where a major development[53] is proposed in a flood zone 2 or 3, a development in a flood zone 1 where there are critical drainage problems, any development larger than one hectare, a development 20 metres from the bank top of a main river and any culverting operation or development which controls the flow of any river or stream.

The Flood and Water Management Bill 2010 describes the role and responsibilities for risk management authorities, which are the EA, local authorities, IDBs, water companies and highway authorities. The EA now exercises a general supervision over all matters relating to flood and coastal erosion risk management and formulates a National Flood and Coastal Erosion Risk Management Strategy (Defra and Environment Agency 2011). The LLFAs (the unitary authority for the area, or the county council) develop a local FRM strategy. They are responsible for flood and water management, but may delegate functions to other risk management authorities. In the

[53] A major development is a residential development with more than ten dwellings or a site area of more than 0.5 hectares, or a non-residential development where the floor space is 1,000 m^2 or more, or the site area is one hectare or more.

future,[54] the LLFAs will also be responsible for adopting and maintaining SuDS through their SuDS Approval Bodies (SABs), except for single properties and roads.

National planning policy

The National Planning Policy Framework (NPPF) has, at its heart, a presumption in favour of sustainable development. This means that local planning authorities should positively seek opportunities to meet the development needs of their area, whilst taking economic, social and environmental dimensions into account. Regarding FRM, one of the policies in the NPPF is to meet the challenge of climate, flooding and coastal change. Local authorities should take full account of flood risk and should direct development away from areas at the highest risk of flooding. If development is necessary, development should be made safe without increasing flood risk elsewhere. To achieve this, local plans should apply a sequential test to plan development away from flood zones and an exception test to determine if development in a flood zone is necessary. Local plans should be informed by a Strategic Flood Risk Assessment (SFRA), whilst developments with a flood risk should conduct a site-specific flood risk assessment (DCLG 2012a).

The NPPF Technical Guidance goes into more detail on how to conduct an SFRA and sequential and exception tests. It describes the flood zones, which determine if a site-specific flood risk assessment is necessary and what development would be appropriate. Flood zone 1 has a low probability of flooding, which is less than 0.1% annually. Flood zone 2 has a medium probability of flooding, for river flooding between 0.1% and 1% annually and for coastal flooding between 0.1% and 0.5% annually. Highly vulnerable development such as emergency services, caravans and hazardous storage are only permitted if they pass the exception test. Flood zone 3a has a high probability, which is more than 1% annually for river flooding and more than 0.5% annually for coastal flooding. Highly vulnerable development is not allowed, but more vulnerable development, such as hospitals, care homes and landfill sites and essential infrastructure such as evacuation routes and electricity and water provisions are permitted if the exception test is passed. Flood zone 3b is a functional floodplain, where water has to flow or be stored in times of flood. Only water-compatible uses are allowed and essential infrastructure needs to pass the exception test.

[54] As of December 2013, this was expected in 2014.

Other plans

Catchment Flood Management Plans (CFMPs) are created by the EA and include an overview of flood risk across a river catchment. They also recommend ways of managing those risks now and over the next 50–100 years. The EA also develops Shoreline Management Plans, which are an assessment of the risks associated with coastal processes.

Finally, Surface Water Management Plans outline the preferred surface water management strategy in a local area, conducted by local actors, such as the local authority, water and sewerage companies, the EA and IDBs. This plan is not required by legislation, but is developed voluntarily.

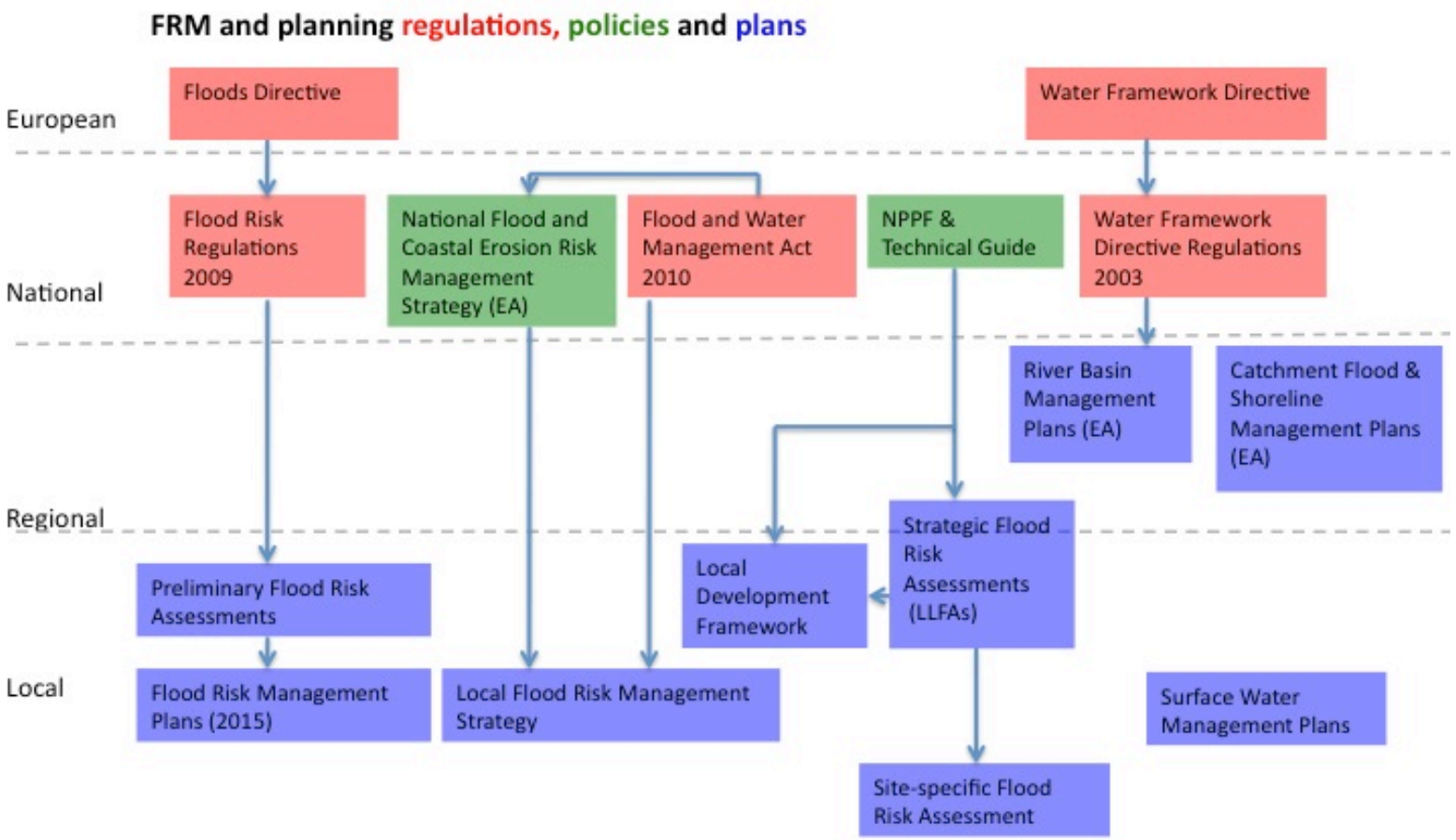

Figure 33: Current regulations on flood risk management and planning

Appendix B Key events in flood risk management in England

Year	Event	
1427	Sewers Act	Establishment of commissioners of sewers, the first drainage authorities
1909	Planning Act	First Act allowing local authorities to prepare planning schemes
1947	Thames floods	Fluvial flooding
″	Circular on development in floodplains	First policy that converged FRM and planning; local planning authorities to liaise with river boards in order to prevent development in floodplains
1953	East coast of England floods	Coastal flooding; led to construction of Thames Barrier
1962	Circular on development in floodplains	Aimed at strengthening liaison processes between local planning authorities and water authorities and preventing development in floodplains
1968	Town and Country Planning Act 1968	New system of structure plans and local plans
1969	Circular on development in floodplains	Aimed at strengthening liaison processes between local planning authorities and water authorities and preventing development in floodplains
1982	Circular on development in floodplains	Aimed at strengthening liaison processes between local planning authorities and water authorities and preventing development in floodplains
1989	Water Act 1989	Privatisation of water companies and establishment of the National Rivers Authority
1992	Circular on development in areas at risk of flooding	Local authorities to liaise with the NRA and to restrict development in flood risk areas

Year	Event	
1995	Environment Act 1995	Establishment of the Environment Agency to replace the NRA
1998	Flooding in various parts of England	Fluvial and pluvial flooding
2000	Flooding in various parts of England	Mainly fluvial flooding
2001	Planning Policy Guidance 25	PPG on development and flood risk
2004	Planning and Compulsory Purchase Act 2004	Establishment of LDFs and statutory duty in planning to contribute towards sustainable development
2005	Making Space for Water	Government document developing comprehensive approach to manage future floods
″	Floods in Cumbria	Fluvial flooding
2006	Planning Policy Statement 25	PPS on development and flood risk to replace PPG25
″	EA statutory consultee in planning process	EA is a statutory consultee if development is in flood zones 2 and 3, if the area has critical drainage problems, if it is one hectare or more or near a main river
2007	Floods in various parts of England	Included widespread pluvial flooding
″	Flooding Direction	If a local authority intents to approve a planning application against the EA's advice, it has to be referred to the Secretary of State
2008	PPS25 Practice Guide	Practice guide to accompany PPS25, providing guidelines on how to implement development and flood risk policies

Year	Event	
″	Pitt Review	Independent review on the 2007 floods
2009	Floods in Cumbria	Mainly fluvial flooding
2010	Flood and Water Management Act 2010	Establishment of LLFAs and national strategy for flooding
2012	Floods in various parts of England	Heavy rainfall events and fluvial, pluvial, sewer and groundwater flooding
″	NPPF	National Planning Policy Framework and Technical Guidance
2013	Consultation on Flood Re	New insurance system for flooding damage
2014	Schedule 3 Flood and Water Management Act 2010	Estimated implementation date[55] of Schedule 3, which establishes SuDS Approving Bodies

Table 6: Key events in flood risk management in England

[55] As of December 2013.

Appendix C Key actors in flood risk management in England

Actor	Type	Role in planning process	Interest	Scale of action
EU	Public	Legislator	Managing flood risk in EU in public interest	Directives are transposed into British law, influencing national and local policy
Central government	Public	Legislator, policy maker and implementer	Managing flood risk in England in public interest and plan for sustainable development	Policy formation on national level; directly and indirectly policy formation and implementation on local level
Local government	Public	Legislator, policy maker and implementer	Managing flood risk in local area in public interest and plan for sustainable development	Policy formation and implementation on local level
Environment Agency	NDPB	Statutory consultee[56]	Managing flood risk and water quality	Policy formation and implementation on national and local level
Water and sewerage companies	Private	Consultee	Managing water provision and sewerage; profit for shareholders	Policy formation and implementation on national and local level

[56] The EA becomes a statutory consultee when certain conditions have been met; see for instance Appendix A.

Actor	Type	Role in planning process	Interest	Scale of action
Internal Drainage Boards	NDPB	Consultee	Managing drainage	Policy formation and implementation on national and local level
Highway authorities	Various	Statutory consultee[57]	Managing roads (incl. run off)	Policy formation and implementation on national and local level
Canal & River Trust	Not for profit	Statutory consultee[58]	Managing canals and rivers	Policy formation and implementation on national and local level
Navigation authorities	Various	Consultee	Managing waterways etc.	Policy formation and implementation on national and local level
Marine Management Organisation	NDPB	Consultee	Managing the marine environment	Policy formation and implementation on national and local level

[57] The Highway Agency becomes a statutory consultee when a development is likely to affect the strategic road network, or under certain other conditions. The local highway authority becomes a statutory consultee when a development involves a new access to the highway network or an increase in traffic movements.
[58] The Canal & River Trust become a statutory consultee when a development is likely to affect canals or nearby areas.

Actor	Type	Role in planning process	Interest	Scale of action
Emergency services	Various	Consultee	Managing emergencies (incl. flooding)	Policy formation and implementation on national and local level
Insurance companies	Private	Provide flood insurance	Providing private insurance (incl. flood insurance); profit for shareholders	Policy formation on national level
CIRIA	Not for profit	Research and guidance for construction industry	Providing business improvement services and research activities for members	Policy formation on national level and indirect influence on policy implementation
Communities	Private / civil society	Consultation, involvement	Individual and community interest	Policy formation and implementation on national and local level
Developers	Private	Applicant	Realising development / profit	Policy formation and implementation on national and local level
National Flood Forum	Not for profit	Consultee	Lobbying on behalf of communities	Policy formation on national and local level (through Community Groups)

Table 7: Actors, roles and interests involved in flood risk management

Source: DCLG 2009, 2013, *Flood and Water Management Act 2010: Chapter 29* 2010

Appendix D Shortlist of case options

Name of project	Location	Develop-ment	Application start	Interaction	Approval/ Objection EA	Compliance with FRM policy	Network	Flood issue	Planning stage
Newcastle Great Park	Newcastle upon Tyne	Mixed; 1200 acres	1999	Cooperation	EA approves	Outline application before PPS25	Large: residents, council, EA, developers, water company	Flood experience	Being built
Cricket club grounds	Chelmsford, Essex	Mixed; 413 dwellings, cricket club, retail, offices	2008	Conflict	EA objects	Conflicts with PPS25	Large: residents, council, EA, developers, cricket club, SoS	Flood experience, political	Approved by SoS
Cleevelands	Bishops Cleeve, Tewkesbury, Gloucestershire	Housing; 550	2010	Conflict	EA approves, parish council objects	Complies with PPS25	Medium: parish council, district council, residents, EA, developer	Flood experience	Decision not taken yet

Name of project	Location	Develop-ment	Application start	Interaction	Approval/ Objection EA	Compliance with FRM policy	Network	Flood issue	Planning stage
Brigg	Brigg, North Lincolnshire	Housing; 60	2010	Conflict	EA approves, town council objects	Complies with PPS25	Medium: town council, district council, EA, developer	Flood experience	Approved by committee
Broad Street	Portsmouth	Housing; 17	2007	Conflict	EA objects	Conflicts with PPS25	Medium: council, EA, developer, SoS	Flood zone and development pressure	Referred to SoS
Tipner	Portsmouth	Mixed; 518 dwellings	2010	Cooperation	EA approves	Complies with PPS25	Medium	Flood zone and development pressure	Decision not taken yet
Scottish & Southern Energy Depot	Portsmouth	Housing; 162	2009	Cooperation	EA objects	Conflicts with PPS25; insufficient FRA	Medium	Flood zone and development pressure	Decision not taken yet
Brent Cross regeneration	London	Mixed	2010	Cooperation	EA approves	Complies with PPS25	Medium	Flood zone and development pressure	Being built

Name of project	Location	Develop-ment	Application start	Interaction	Approval/ Objection EA	Compliance with FRM policy	Network	Flood issue	Planning stage
Thames Gateway / Northfleet Embankment	Kent	Mixed; 2670 dwellings, 154,000 m^2 office	2009	Cooperation	EA approves	Complies with PPS25	Medium	Flood zone and development pressure	Being built

Table 8: Shortlist of cases

Appendix E Documents collected on Newcastle Great Park

Note: In some document titles, names have been replaced by the function of the person, e.g. Planning Officer, for ethical reasons.

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Appendix G List of interviews

Case	Job description	Organisation	Date interviewed	Additional personal communication	Referenced
Newcastle Great Park	Councillor	Newcastle City Council	27 January 2012		Councillor A
	Planning Officer	Newcastle City Council	2 February 2012		Planning Officer A
	Engineer	Newcastle City Council	2 February 2012	2 August 2012	Council Engineer
	Project Leader	Consortium of developers	3 February 2012		Developer A
	Planning Officer	Newcastle City Council	6 February 2012		Planning Officer B
	Flood Risk Officer	Environment Agency	8 February 2012	30 March 2012 9 July 2012	EA Officer A
	Manager	Water and sewerage company	17 February 2012		WaSC Officer
	Flood Risk Officer	Environment Agency	16 March 2012		EA Officer B

Case	Job description	Organisation	Date interviewed	Additional personal communication	Referenced
	Planning Officer	Newcastle Airport	30 March 2012[59]		Airport Officer
	Party Representative	Newcastle Green Party	6 June 2012	1 May 2012 9 May 2012	Green Party Representative
	Chair	Local Residents' Association NGP	12 July 2012	5 August 2012	LRA Chair
	Councillor	Newcastle City Council	31 July 2012		Councillor B
	Councillor	Newcastle City Council	31 July 2012		Councillor C

Table 9: List of conducted interviews for Newcastle Great Park case

[59] The Airport Officer's interview was a written interview by email, due to time constraints posed by the participant.

Case	Job description	Organisation	Date interviewed	Additional personal communication	Referenced
Chelmsford cricket ground development	Planning Officer	Chelmsford City Council	21 May 2012		Planning Officer C
	Flood Risk Officer	Environment Agency	22 May 2012		EA Officer C
	Local Resident/member	Local Residents' Group	22 May 2012		LRG A
	Local Resident/member	Local Residents' Group	22 May 2012		LRG B
	Planning Consultant	Planning Consultancy	23 May 2012		Consultant A
	Senior Manager	Cricket Club	25 May 2012		Cricket Club Manager
	Project Leader	Development Company	5 July 2012		Developer B
	Flood Risk Consultant	Flood Risk Consultancy	12 July 2012		Consultant B

Case	Job description	Organisation	Date interviewed	Additional personal communication	Referenced
	Flood Risk Officer	Environment Agency	3 August 2012	13 July 2012 3 August 2012	EA Officer D
	Flood Risk Officer	Environment Agency	3 August 2012	3 August 2012	EA Officer E
	Planning Officer	Chelmsford City Council	21 August 2012		Planning Officer D
	Councillor	Chelmsford City Council	22 July 2013	25 July 2013	Councillor D

Table 10: List of conducted interviews for Chelmsford cricket ground case

Appendix H NVivo coding for Newcastle Great Park committee documents

Node category	Node name	Node name subcategory	Number of references
Actors	Aviation		1
	Consortium		19
	Councillors		4
	EA		44
	Newcastle City Council		19
	Newcastle Great Park Advisory Committee		104
	Newcastle University		1
	North Gosforth Parish Council		1
	WaSC		23
	Ouseburn Steering Group		1

Node category	Node name	Node name subcategory	Number of references
	Public		38
	Fawdon Ward Sub Committee		1
	Highway Agency		3
	Flood risk consultant		1
Interaction	Perceptions		38
	Consultation		12
	Interaction		17
FRM	Climate change		1
	Drainage		17
	EU and national policy developments		10
	Floodplain		12

Node category	Node name	Node name subcategory	Number of references
	Flood risk		40
	Flooding		37
	Local policy		13
	Research		6
	Role and responsibility		40
	SuDS maintenance		3
	SuDS		102
Planning	Local planning policy		1
	Masterplan revised		21
	National policy developments		4
	Section 106 agreement		7

Node category	Node name	Node name subcategory	Number of references
	Cells	Cell B	6
		Cell C	20
		Cell G	46
		Cell H	14
		Cell I	22
		Planning application	16
Year	2001		13
	2002		5
	2003		4
	2004		16
	2005		24

Node category	Node name	Node name subcategory	Number of references
	2006		12
	2007		8
	2008		9
	2009		6
	2010		7
	2011		3

Table 11: NVivo coding for Newcastle Great Park documents

Appendix I Questions derived from theoretical framework

Question	Sub-question
1 What is the flood risk issue in this development?	1.1 What is the development project? 1.2 What is the flood risk? 1.3 What is the problem (does problem differ amongst actors/over time)?
2 What is the relevant formal institutional setting?	2.1 What are relevant national regulations and policies? 2.2 What are the regional regulations and policies if relevant? 2.3 What are the local regulations and policies? 2.4 What influence did these have on the agents or process?

Question	**Sub-question**
3 What is the informal institutional setting / network structure?	3.1 What are the actors' norms and values? 3.2 Have the actors met before? 3.3 Are there any formal/informal rules in the network? 3.4 How does this structure influence the agents or process?
4 What relevant events have occurred?	4.1 Have there been flood crises in the development or in the local area? 4.2 Have there been changes in the national, regional or local political context? 4.3 Have there been any other relevant events? 4.4 What influences have these events had on the agents and process?

Question	Sub-question
5 What other structures are relevant?	5.1 Have there been any other structures of influence? 5.2 How have these influenced the agents and process?
6 What are the characteristics of the actors?	6.1 What actors have been involved in the process? 6.2 What are the perceptions of actors on risk of flooding, solutions to flood risk and priority of flood risk? 6.3 What preferred policy outcomes do actors have? 6.4 What resources do actors have and what interdependencies does this cause? 6.5 What influence do the actor characteristics have on the process?

Question	**Sub-question**
7 What are the characteristics of the actor interactions?	7.1 Has there been cooperation or conflict? 7.2 Has there been any network management and by whom? 7.3 What influence do the interactions have on the process?
8 What is the policy outcome?	8.1 What flood risk measures have been taken in the development? 8.2 Have there been any other effects of the outcome on the wider setting or environment? 8.3 Are the actors content with the outcome? 8.4 What has influenced the outcome?

Question	Sub-question
9 What are the dialectical relationships in this case?	9.1 What is the dialectical relationship between network and wider context? 9.2 What is the dialectical relationship between network and agents? 9.3 What is the dialectical relationship between network and outcome?
10 What have been the key factors influencing the outcome in the case?	10.1 What have been the key factors influencing the outcome?

Table 12: Questions derived from theoretical framework

Appendix J Informed consent form

Informed Consent Form

Title research: Governance of flood risk management
Researcher: Ellen Bekker
School of Architecture, Planning and Landscape
Newcastle University
[Email address removed]

I, the undersigned, confirm that (please tick box as appropriate):

1.	I understand the information about the project and the purpose of the interview.	☐
2.	I have been given the opportunity to ask questions about the project and my participation.	☐
3.	I voluntarily agree to participate in the project.	☐
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	☐
6.	If applicable, separate terms of consent for interviews, audio, video or other forms of data collection have been explained and provided to me.	☐
7.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐

Participant:

_____ _____ _____
Name of Participant Signature Date

Researcher:

_____ _____ _____
Name of Researcher Signature Date

Appendix K Standard interview guide Newcastle Great Park

Introduction

Thank you for agreeing to an interview. The information provided by you will be kept anonymous. The interview will be voice recorded but these recordings will be deleted later and kept entirely anonymous.

My research is about how flood risk management is governed through the planning process for new urban developments. I am looking at which actors are involved, their characteristics, how they make decisions and what has influenced these decisions. One of my cases is Newcastle Great Park (NGP), which is why I asked to interview you to find out more about the decision-making process.

Questions

General

1. Can you please describe the work you do?
2. When were you involved with the NGP project?

Flood issues

3. What are the main flood risk issues for NGP?
4. Do you think flood risk is an important problem for NGP?
5. How did the idea of using sustainable drainage come about?

Process

6. What is your responsibility concerning flood risk matters in NGP?
7. What is your role in deciding on flood risk management?
8. What resources do you have to support flood risk management?
9. Who have been involved in deciding on what flood risk measures to take in NGP?
10. How do you meet them? How often do you meet them?
11. Do you meet them outside the NGP project as well?
12. What are the main issues in deciding on how to manage flood risk?
13. Are there any differences between how you want to manage flood risk and how others want to do it? Others being:

- Planners
- Environment Agency
- Developers
- Northumbrian Water
- Councillors

14. Do any of the above take the lead in the decision-making process?
15. How is decision making characterised? Does everyone try to find a solution together, is it more about compromising or does everyone try to reach their own goals?
16. How are decisions made; through negotiated agreement, or is it one person or organisation taking the ultimate decision?
17. Are you content with how decisions have been made? What would you like to change?
18. What input do you have in decision making?
19. Who do you feel has the largest input?
20. Do you trust the other actors to want to effectively tackle flood risk in NGP?
21. Do you trust the information on flood risk in NGP?
22. What would you like to change in your role or in your resources for managing flood risk in new developments?

Environment

23. What are the most important factors influencing the decision-making process?
24. How do you think national regulations and policies help or hinder the implementation of flood risk measures in NGP?
25. Has flooding in neighbourhoods near NGP had an impact on the decision-making process?

Outcomes

26. Are you happy with the flood risk measures that have been put in place?
27. What would you change?
28. What have you learned from this process?

Conclusion

- Thank you for the interview.
- Do you have any questions or would you like to add anything?

- Can I email you if I need to clarify something?
- Would you like me to send you my research findings?
- Do you know of other people whom I can talk to, which would be helpful for my research?
- Would you please sign this consent form, which I need to show that ethical issues have been taken into account in my research?

Appendix L Standard interview guide cricket ground development

Introduction

Thank you for agreeing to an interview. The information provided by you will be kept anonymous. The interview will be recorded, but only with your permission, and these recordings will be deleted later and kept entirely anonymous.

My research is about how flood risk management is governed through the planning process for new urban developments. I am looking at which actors are involved, their characteristics, how they make decisions and what has influenced these decisions. One of my cases is the redevelopment of the Essex County Cricket ground, which is why I asked to interview you to find out more about the decision-making process.

Questions

General

1. Can you please describe the work you do?
2. When and how did you become involved with the Cricket Club redevelopment?
3. How did the idea of this redevelopment come about?
4. Can you please talk me through the decision-making process up until permission was granted?

Flood issues

5. What do you perceive as the main flood risk issues for the development?
6. Do you think flood risk is an important problem for the development? (versus development benefits)

Process

7. What was your responsibility concerning flood risk matters in the development?
8. What was your role in deciding on flood risk management?
9. What resources did you have to support flood risk management?
10. Were there any differences between how you wanted to manage flood risk and how others want to do it? Others being:
    - Planning officers
    - Environment Agency

- Cricket club
- Residents

11. How would you meet these others to make decisions?
12. Did you meet them outside this project as well?
13. How was decision making characterised? Did everyone try to find a solution together, was it more about compromising or did everyone try to reach their own goals?
14. Who do you feel had the largest input?
15. Did you trust the other actors to want to effectively manage flood risk?
16. Are you content with how decisions were made? What would you like to have changed?
17. What were the most important factors influencing the decision-making process?
18. How do you think national regulations and policies helped or hindered the implementation of flood risk measures in the development?
19. Is there anything you would like to change in your role or in your resources for managing flood risk in developments?

Outcomes

20. Are you happy with the flood risk measures that have been put in place?
21. What would you change?
22. What have you learned from this process?

Conclusion

- Thank you for the interview.
- Do you have any questions or would you like to add anything?
- Can I email you if I need to clarify something?
- Would you like me to send you my research findings?
- Do you know of other people whom I can talk to, which would be helpful for my research?
- Would you like to sign this consent form, which I need to show that ethical issues have been taken into account in my research?

Appendix M Photographs of Newcastle Great Park SuDS

Figure 34: Ouseburn and SuDS in Cell G, Newcastle Great Park[60]

Source: Author 2012

Figure 35: Outlet into SuDS in Cell G, Newcastle Great Park

Source: Author 2012

[60] The pictures of the SuDS in Cell G were taken after heavy rainfall, July 2012.

Figure 36: SuDS in Cell C, Newcastle Great Park

Source: Author 2012

Figure 37: Letch in Cell C, Newcastle Great Park

Source: Author 2012

Figure 38: Outlet into SuDS in Cell H, Newcastle Great Park

Source: Author 2012

Figure 39: SuDS and open space in Cell H, Newcastle Great Park

Source: Author 2012

Appendix N Photographs of Chelmsford cricket ground

Figure 40: River Can and development site, Chelmsford

Source: Author 2012

Figure 41: Existing development adjacent to the development site, Chelmsford

Source: Author 2012

Figure 42: Development site from across the river Can, Chelmsford

Source: Author 2012

Figure 43: Development site, Chelmsford

Source: Author 2012

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